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North Koreas Nuclear Futures: Implications for Peace and Security

Wit, Joel S.

US-Korea Institute at SAIS

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Title of Proposal: North Korea's Nuclear Futures: Implications for Peace and Security

Principal Investigator: Joel S. Wit

Date: June 14, 2016

Project Final Report

The US-Korea Institute (USKI) at the Johns Hopkins School of Advanced International Studies (SAIS) is pleased to report on the activities and outcomes of our North Korea's Nuclear Futures project made possible through grant funding from the Naval Postgraduate School's Project on Advanced Systems and Concepts for Countering Weapons of Mass Destruction (PASCC) in the amount of \$225,533.52 from June 5, 2014 to November 29, 2015. We thank PASCC for its generous support, which enabled us to contribute to efforts to analyze the future of North Korea's nuclear deterrent and to encourage work on this topic in the United States and overseas, specifically in Northeast Asia.

Our project was designed to examine the emergence of North Korea as a small nuclear power, a process that has been underway since 2009, if not earlier. When the project was first proposed, North Korea had just conducted two long-range rocket tests in 2012 and its third nuclear test in February 2013, highlighting that trend. However, it was unclear where it would lead in the future, namely the size of North Korea's nuclear deterrent, Pyongyang's thinking on its nuclear strategy, regional and international implications of a growing nuclear force and possible policy responses of the United States, its allies and the international community.

Given this emerging context, at the outset of our project our objectives were to: 1) generate analysis on North Korea's aspirations, related challenges and implications for US policies, plans and capabilities; 2) establish an analytical dialogue through a workshop and meetings to bring together prominent experts from the public sector and the government to formulate its conclusions; and 3) foster an international community of strategic studies experts that did not previously exist to carry forward work on North Korea's growing nuclear capabilities and their implications for international peace and security (particularly in Northeast Asia among policymakers and experts). During the course of the project, our intention was to produce briefings, reports and articles based on our workshops for US officials and broader audiences.

Over the course of the project period, we held one scoping meeting and three workshops in the United States that brought together American experts from different communities—regional, functional and technical—to help fulfill our mandate. In doing so, we also partnered with other institutions in Washington, DC—the Center for the Study of Weapons of Mass Destruction at the National Defense University and the Brookings Institution—to draw in a wide range of government officials from the Department of Defense, Department of State, Joint Chiefs of Staff,

Strategic Command (STRATCOM), the Defense Threat Reduction Agency (DTRA) and further disseminate our work. We produced a series of analytical reports and briefings—12 reports published on the *38 North* website alone. Our efforts received widespread public attention in the media (including editorials in the *New York Times* and *Washington Post*) as well as in the US and other governments. Overall, it helped enhance the public debate on this important issue. Moreover, all of our work during 2014-2015 proved to be especially timely given North Korea's fourth nuclear test in January 2016 and its space launch a month later.

A key part of our project was also to hold briefings in China, South Korea and Japan on the results of our effort. In November 2015, five American experts visited Beijing, Seoul and Tokyo to brief government officials, think-tank experts, media and others on the final results of the project. Our team covered a variety of topics—projections of qualitative developments in North Korea's nuclear and missile arsenals to 2020 as well as the possible evolution of Pyongyang's nuclear strategy, the future impact on North Korea's behavior addressing the issue of whether the North will become more provocative with a growing nuclear arsenal, and the danger posed to the regional and international non-proliferation regime of a nuclear North Korea.

Outputs

Over the course of our project, we identified three key outputs: generate analyses on North Korea's nuclear aspiration, challenges and implications for US policy; establish a dialogue by convening experts from various backgrounds to formulate conclusions; and establish a broader dialogue with colleagues in East Asia, including South Korea, China, and Japan. An overview of each output and assessment follows.

Generate analyses on North Korea's aspirations, related challenges and implications for US policies plans, and capabilities.

We received funding for an initial scoping meeting that helped identify and discuss major issues involved with a project on this topic and three two-day workshops that looked in greater depth at the main issues. Overall the topics covered were:

- North Korea's nuclear and missile force development: The common view has been that North Korea's WMD programs—particularly nuclear and missile—have been too shrouded in secrecy to arrive at any substantive conclusions. Given uncertainties in paths forward, we established North Korea's current stockpile and baseline capabilities to derive three projections—high, medium and low—capturing a range of possible force developments and outcomes. Analysis focused on the development of technology—nuclear and missile—and strategy looking out to 2020.

- Implications for the United States, Northeast Asia and the international community: A second set of papers examined the implications of a nuclear North Korea with a growing stockpile, focusing on how those increasing capabilities might affect North Korea's future behavior. A more provocative Pyongyang in 2020 would yield important implications for regional stability. Other analysis examined implications for: 1) the geopolitics of Northeast Asia, specifically for the US rebalancing policy putting more emphasis on Asia for its external policy and extended deterrence as it applies to South Korea and Japan; 2) US and ROK military strategy on the Korean peninsula; and 3) the international and regional nonproliferation regime.
- Possible future policy options for dealing with a nuclear North Korea: Papers focused on the utility of positive and negative economic levers, measures to strengthen US and allied defenses, the possibilities for peaceful paths forward through diplomatic engagement and the role of soft-power—such as information and humanitarian assistance—in dealing with the DPRK.

In addition to the 12 substantive papers that resulted from these workshops that have been posted on the 38 North website under “North Korea’s Nuclear Futures” project (<http://38north.org/category/nukefutures/>), the project director also produced a full-length briefing on its results that served as the basis for other discussions in Washington and abroad.

Establish an analytical dialogue through workshops and meetings to bring together prominent experts to formulate its conclusions.

The scoping meeting and three workshops accomplished this objective through not only bringing together prominent experts, but also experts from different communities—functional and regional experts from think tanks, academia and government—who normally do not work together. An important premise for our project was that adopting a multi-disciplinary approach to examine North Korea-specific evidence on political, technical, economic and other factors likely to shape Pyongyang's choices as an emerging nuclear power was an important avenue to explore in thinking about the future. It was also critical to incorporate a comparative approach that drew on four decades of scholarly work examining small nuclear powers in order to shed light on the future direction of North Korea's programs. We succeeded in pulling together this intellectual mix throughout the project in ways that have not been tried or accomplished in the past and the product is reflected in the project's analysis, the result of discussions in each of the meetings. (See Appendix 2 for attendees at scoping meeting and workshops.)

Establish a broader dialogue with policymakers and academics in South Korea, Japan and China.

After the three workshops were completed in DC, key contributors to the project traveled to Beijing, Seoul and Tokyo in November 2015 to present conclusions from their research. The

briefing series provided both public and private platforms to disseminate information to and build dialogue with our colleagues in East Asia. To conclude the project, the final briefing was conducted at SAIS in Washington, DC for local experts, policymakers and press.

Project Outcomes

The “North Korea’s Nuclear Futures Project” has had a significant impact on the public and governmental discussions in the United States and overseas about the nuclear and missile threat North Korea poses. For example, in the aftermath of our initial workshop and publications focusing on North Korea’s nuclear and missile programs in early 2015, the results of our work received extensive media attention with more than 500 news clips covering our conclusions. Aside from editorials in the *New York Times* and *Washington Post* specifically citing findings from the project and calling the need for greater US action to deal with a nuclear North Korea, the story was also covered on blogs, independent news outlets, major media (such as the *ABC News*, *CNN* and *Fox News*, wire services (*AP*, *Reuters*, *Bloomberg News*, *AFP*) and other international outlets. It appeared in countries ranging from Afghanistan to Zimbabwe and in multiple languages including English, Chinese, Japanese, Korean, French and German. Some of the conclusions were even cited by Israeli Prime Minister Benjamin Netanyahu in his speech to a joint session of the US Congress.

Additionally, we successfully incorporated the insight of experts across different disciplines in ways that have not been tried or accomplished in the past to address the issue. This intellectual mix is reflected in the project’s analyses, the result of discussions in each of the meetings. For example, one project paper looking at the future behavior of a nuclear North Korea combined the talents of Dr. Robert Jervis, one of America’s foremost thinkers on the nuclear age and a professor at Columbia University with Robert Carlin, a well-known expert on North Korea who spent decades in the US government following the DPRK and is now a Visiting Scholar at Stanford University. (See Appendix 6 for all North Korea’s Nuclear Futures publications. Please note that two reports are still in production at this time and will be forwarded upon completion.)

Also, while many of the US government officials attending our workshops had practical experience working on day-to-day policy towards North Korea in agencies such as the Department of State, Department of Defense, Joint Chiefs of Staff and the intelligence community, our workshops gave them an opportunity to look ahead at how the North Korean threat might develop by 2020, something that government officials often are too busy to do. That opportunity provided greater clarity for them in terms of how North Korean capabilities and strategy might develop in the future as well as how the implications—security, nonproliferation and others—might evolve. In at least one instance, our work stimulated a government agency to start its own study looking at the future of North Korea’s nuclear and missile forces and the implications for US security.

The impact of our work, private and public, was magnified by Pyongyang's recent nuclear test and space launch, both of which focused attention on our project as the only "game in town." No other public institution has undertaken such an effort, making the results even more unique and timely.

Implications

Our project shined a spotlight on possible developments in North Korea's nuclear forces over the next five years and particularly the policy implications of those developments. The policy implications of North Korea's nuclear weapons and missile programs was a key component of our effort and the subject of the second workshop held by our project. Published analysis looked at the impact on North Korea's future behavior (whether it will become more provocative and result in greater regional instability), geopolitical issues (particularly the impact on US alliances with the Republic of Korea and Japan through its effect on extended deterrence), and nonproliferation implications (namely will a growing nuclear program prompt other countries in the region, Japan and South Korea, to "go nuclear" as well as undermine the international non-proliferation regime?). While the project contributed enormously to the public debate about North Korea and better informed a number of US government officials, it has not resulted in an altered overall strategy towards North Korea by the Obama administration.

Evaluation

The "North Korea's Nuclear Futures Project" significantly impacted the public and governmental discussions in the United States and overseas about the nuclear and missile threat posed by that country. As discussed previously, the initial workshop and papers published received extensive media coverage, prompting two editorials calling for greater US action towards addressing the North Korea nuclear issue in the *Washington Post* and *New York Times* and over 500 news clips across 50 countries. Additionally, one government agency was prompted to initiate its own study in North Korea's nuclear and missile capabilities and US security implications.

In this context, part of our project was to disseminate our findings in Northeast Asia, specifically through a briefing trip to South Korea, China and Japan, which proved to be very successful. In each country, we held meetings with government officials, think-tank and university experts, the media and the public to discuss the project's results. The sessions were well attended and it was clear through questions and discussions that there was a great deal of interest in the subject matter. Moreover, many of the government officials and private experts had been following the project with great interest already through reading analysis published on *38 North*.

The project significantly contributed to the public debate about North Korea and better informed several US government officials. The impact of our work, private and public, was magnified by Pyongyang's recent nuclear test and space launch, both of which focused attention on our project as the only "game in town." No other public institution has undertaken such an effort, making the results even more unique and timely. Certainly, our project shined a spotlight on possible developments in North Korea's nuclear forces over the next five years and particularly the policy implications of those developments. The policy implications of North Korea's nuclear weapons and missile programs were a key component of our effort and the subject of the second workshop held by our project. Published analysis looked at the potential impact on North Korea's future behavior (whether it will become more provocative and result in greater regional instability), geopolitical issues particularly the impact on US alliances with the Republic of Korea and Japan through its effect on extended deterrence, and nonproliferation implications.

The North Korea's Nuclear Futures Project is my first project in which I tried to combine different communities of experts—functional and regional, government and non-government—in order to analyze an important issue. In this particular research project, we included experts on North Korea, US security policy in Northeast Asia (particularly our alliances with South Korea and Japan), nuclear strategy and policymaking, and nuclear weapons and missile technology in our scoping meeting and three subsequent workshops. The theory was that including a combination of individuals from these different communities would bring to bare a variety of perspectives and allow the project to come up with better analytical conclusions. In addition to these communities, the project mixed in experts on other small nuclear powers—such as Pakistan, India, Israel, China and South Africa—on the theory that as countries emerge, they face similar technological and doctrinal decisions as to the future shape of their nuclear forces. The combination of all these communities achieved the desired effect with each group making important contributions to the discussions in the meetings and analysis published by the project.

Future Directions in the DPRK's Nuclear Weapons Program: Three Scenarios for 2020

DAVID ALBRIGHT

FEBRUARY 2015



NORTH KOREA'S
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David Albright, a physicist, is founder and President of the non-profit Institute for Science and International Security (ISIS) in Washington, DC. He directs the project work of ISIS, heads its fundraising efforts, and chairs its board of directors. In addition, he regularly publishes and conducts scientific research. He has written numerous assessments on secret nuclear weapons programs throughout the world. During his career, Albright has testified numerous times on nuclear issues before the US Congress. He has spoken to many groups, technical workshops and conferences, briefed government decision-makers, and trained many government officials in non-proliferation policy making. The media frequently cite Albright, and he has appeared often on television and radio. Albright has co-authored four books, including *Peddling Peril: How the Secret Nuclear Trade Arms America's Enemies*, listed by *The Atlantic* as one of the best foreign affairs books of 2010.

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FEBRUARY 2015

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NUCLEAR FUTURES SERIES**

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Future Directions in the DPRK's Nuclear Weapons Program: Three Scenarios for 2020¹

Like many secret nuclear weapons programs, the DPRK goes to great lengths to hide its capabilities to produce nuclear explosive materials and nuclear weapons. Despite these actions, a picture can be drawn of North Korea's current and projected plutonium and weapons-grade uranium (WGU) stocks. Knowing these plutonium and WGU stocks can, in turn, allow an estimate of the DPRK's current number of nuclear weapons and a range of projections of the number North Korea could build in the next several years. Although great uncertainty surrounds these projections, as well as the quality of North Korea's nuclear weapons, these projections form a reasonable picture of the DPRK's possible nuclear weapons futures, absent actions to significantly limit its nuclear programs.

After summarizing estimates of stocks of separated plutonium and weapons-grade uranium as of the end of 2014, this report develops three projections of future nuclear arsenals through 2020: low-end, medium, and high-end nuclear futures. In developing these projections, which are intended to bound North Korea's nuclear futures, a number of constraints are considered, including the number and size of nuclear production facilities, future underground testing, the extent and success of nuclear weaponization efforts, costs and access to necessary goods and classified and proprietary technologies abroad.

¹ Paper prepared for the North Korea's Nuclear Futures Project at the US-Korea Institute at the Johns Hopkins School of Advanced International Studies, and originally published at 38North.org. The plutonium and weapons-grade uranium estimates through 2014 are part of a project that estimated plutonium and highly enriched uranium inventories worldwide that was generously supported by the Nuclear Threat Initiative.

Background

The last several years have witnessed a dramatic and overt build-up in North Korea's nuclear weapons capabilities. The main activities include:

- Separation of several kg of plutonium in 2009 after the collapse of the Six Party Talks;
- Conduct of underground nuclear tests in 2009 and 2013;
- Restart of the small 5 megawatt-electric (MWe) reactor at Yongbyon after a several-year halt;
- Construction of an experimental light water reactor (ELWR) at Yongbyon;
- Revelation of a centrifuge plant at Yongbyon and subsequent doubling of its size; and
- Modernization and construction of many buildings at Yongbyon, probably to enable future production of fuel for the 5 MWe reactor and the ELWR and to support the centrifuge plant.

All these activities have increased suspicions that there may be significant covert nuclear activities, including the operation of a second centrifuge plant and the construction of nuclear weapons.

Current Plutonium and Weaponization Capabilities²

Separated Plutonium Stock

As of the end of 2014, the DPRK is estimated to have a stock of 30-34 kg of separated plutonium, or an average of 32 kg.³ The plutonium was produced in a small nuclear reactor at the Yongbyon Nuclear Scientific Research Center's 5 MWe reactor, which has a total thermal power of about 20 megawatt-thermal (MWth). Although the reactor is aged and started operating in 1986, North Korea has been renovating it in recent years, implying that it may continue operating for many more. In the reactor, plutonium is produced in the uranium fuel along with other radioactive elements. The plutonium slowly builds up in the fuel and the entire core load of fuel is typically discharged every two to four years. Because the discharged fuel is highly radioactive, it is transported in heavily shielded casks by truck to a nearby specialized processing plant, called the Radiochemical Laboratory. This plant chemically separates the plutonium from the uranium and other radioactive materials and converts it into metal form. As metal, the plutonium is the raw material for building nuclear weapons.

Adjacent to the 5 MWe reactor, the DPRK is constructing what is called an experimental light water reactor (ELWR) with a stated power of about 100 MWth and an electrical output of about 30-35 MWe. The ELWR has not yet started operation but could do so in 2015 or 2016.

Whether the ELWR will be strictly for civil purposes is not known. In particular, will North Korea use this reactor to make plutonium for nuclear weapons? Normally, this type of reactor is not used to make weapons-grade plutonium. However, North Korea could deploy known methods to produce weapons-grade plutonium in a practical manner and separate the plutonium in the Radiochemical Laboratory without major modifications.

If the ELWR were limited to strictly civilian use and optimized to make electricity economically, it would produce plutonium that is not ideal for nuclear weapons—called reactor-grade plutonium. Typically, the fuel, in which the plutonium is produced, contains low-enriched uranium (LEU) containing about 3-4 percent uranium-235, and this fuel is typically heavily

² This section draws from Albright, "North Korean Plutonium and Weapon-Grade Inventories, End 2014," January 15, 2015 (to be published). There is additional plutonium in the fuel in the core of the 5 MWe reactor and perhaps some in discharged irradiated fuel, but none of this plutonium is separated and thus unavailable for weapons as of the end of 2014. However, this plutonium is added to the nuclear explosive material stocks in the three post-2014 projections discussed below. This paper is part of a project that estimated inventories of plutonium and highly enriched uranium worldwide that was generously supported by the Nuclear Threat Initiative.

³ Ibid.

irradiated in this type of reactor, creating the reactor-grade plutonium rather than the more desirable weapons-grade plutonium sought by nuclear weapons programs. Moreover, North Korea's Radiochemical Laboratory is not designed to separate the plutonium from the ELWR fuel, and would require significant modifications to do so.

If North Korea wanted to use this reactor to produce weapons-grade plutonium, it could do so using a more practical method developed in the 1980s by the US Department of Energy when it was considering alternative methods of making weapons-grade plutonium and tritium for US nuclear weapons. In this case, a light water reactor uses enriched uranium driver fuel (10-20 percent enriched in the isotope uranium-235) and natural or depleted uranium targets, where the weapons-grade plutonium is produced in the targets. Reactor-grade plutonium would be produced in the driver fuel. The weapons-grade plutonium in the targets would be recovered, and targets can be designed to make them relatively straightforward to process in the Radiochemical Laboratory, requiring manageable changes to this plant. An advantage of this method is that there would be no need to process the ELWR driver fuel; it can be stored indefinitely. The processing of this driver fuel would require major modifications to the Radiochemical Laboratory that would be hard to achieve in practice. However, with a driver/target system, the DPRK could efficiently and on a sustained basis make weapons-grade plutonium. Depending on design, it could produce up to 20 kg of weapons-grade plutonium per year.

Plutonium-Based Weapons

North Korea has stated publicly that it has built nuclear weapons. Most of these weapons are likely based on plutonium. Its effort to develop plutonium-based nuclear weapons goes back to at least the 1980s. This section estimates the number of nuclear weapons North Korea could have built from its separated plutonium stock at the end of 2014.

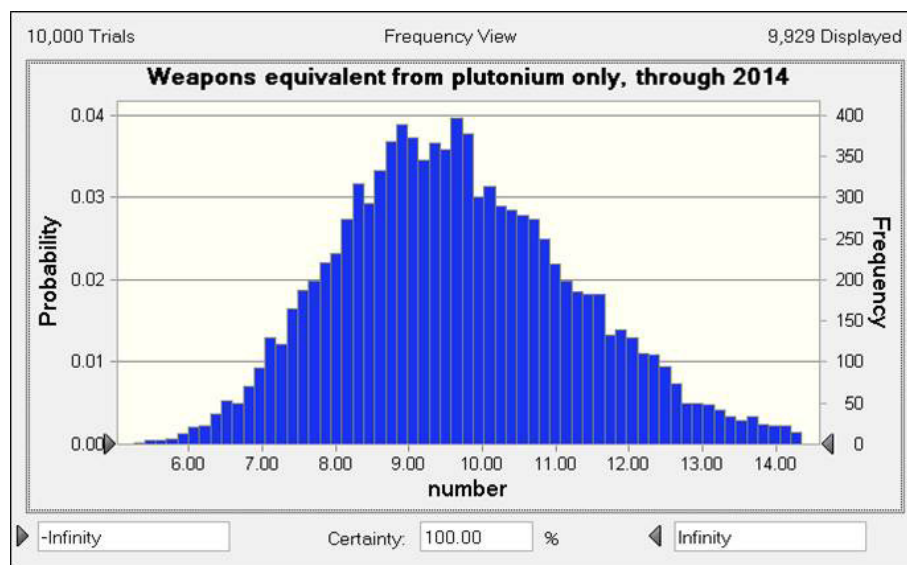
Little is known concretely about North Korea's development or deployment of deliverable nuclear weapons, although it is likely able to build a warhead, perhaps one of limited reliability, which can fit atop a Nodong missile with a range of less than 800 miles.⁴ North Korea has worked on nuclear weaponization for over 20 years and may have received nuclear weapons designs from the A.Q. Khan network in the 1990s or earlier from China, as Pakistan did in the early 1980s. These developments support assessments that North Korea can build a miniaturized warhead for a Nodong and possibly other missiles. In particular, given the likely dimensions of such a warhead, Pyongyang should also be able to place it on a large Taepodong inter-continental ballistic missile (ICBM), although whether such a weapon would prove operationally effective remains unclear due to probable problems with reliability as well as what appears to be lack of reentry vehicle testing.

Any nuclear weapons program is likely to pursue successive designs that use smaller quantities of plutonium in each weapon. In the case of North Korea, faced with a limited stock of plutonium, one would expect that the nuclear weaponization program focused early on developing designs requiring less plutonium than that of first generation fission weapons of the

⁴ Albright, "North Korean Miniaturization," 38 *North*, February 13, 2013, <http://38north.org/2013/02/albright021313/>; and National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, Wright-Patterson Air Force Base, NASIC-1031-0985-09, April 2009.

type detonated by the United States during the World War II Manhattan Project. The Trinity explosion contained about 6 kg of plutonium. Over time, North Korea likely reduced the amount of plutonium it needed in each weapon to significantly less than 6 kg. In its Six Party declaration, the North stated that the 2006 nuclear test contained only 2 kg of plutonium. Although there is wide skepticism about this particular declaration, it reinforces the point that North Korea is likely seeking to use less plutonium in each test than the United States used in the Trinity test.

A North Korean nuclear weapon is assumed in this analysis to contain between 2 and 5 kg of plutonium, where values in the middle of the range are weighted more than those at the ends of the range. This weighting reflects a judgment that North Korea is unlikely to use on average as little as 2 kg or as much as 5 kg per weapon. The most likely values are about 3-4 kg. With this range and a separated plutonium inventory of 32-34 kg, Crystal Ball™ software is used to estimate the number of nuclear weapons that can be made. The results are a slightly skewed distribution with a median of 9.6 nuclear weapons, which would imply 9-10 nuclear weapons. The distribution's standard deviation is 1.7, reflecting the weighting of the amount of plutonium per weapon discussed above. The standard deviation measures how many results are within almost 70 percent of the median. It can be used to produce a range of values that likely capture the true value. In this case, this range would be about 8-11 nuclear weapons. The distribution is below.



It should be noted that this assumes all the available plutonium is used in nuclear weapons. Thus, these values provide the nuclear weapons equivalent of a given amount of plutonium.

The actual number of nuclear weapons would be expected to be fewer in number. A fraction of this plutonium would be tied up in the manufacturing complex that makes plutonium components of nuclear weapons or lost during such processing. Some separated plutonium may be held in a reserve for underground nuclear testing or for new types of weapons. In this estimate, it is assumed that only about 70 percent of the total amount of plutonium is used in nuclear weapons. Applying this assumption, North Korea would have approximately 6-8 nuclear weapons made out of plutonium as of the end of 2014.

Weapons-Grade Uranium and Weaponization Capabilities through 2014⁵

Great uncertainty surrounds the DPRK's production of weapons-grade uranium, the type of enriched uranium typically used in nuclear weapons.⁶ WGU is enriched uranium that contains 90 percent or more of the key nuclear explosive isotope uranium-235. This section focuses on estimating weapons-grade uranium production through 2014.

North Korea is believed to have been using a P2-type centrifuge in its uranium enrichment program, which is composed of a single rotor tube with a bellows in the middle of the tube. It received several such centrifuges from Pakistan and a great deal of associated manufacturing and assembly technology. It is also believed to have produced P2-type centrifuges in large quantities.⁷

It remains uncertain how many centrifuge plants North Korea has built. In addition to the production-scale plant at Yongbyon, US intelligence officials have long asserted that the North has another, hidden, production-scale centrifuge plant.

An estimate of WGU production depends on several factors, including whether there is a secret centrifuge plant in addition to the Yongbyon plant, how many P2-type centrifuges have been deployed successfully, and how well have these centrifuges operated. For example, the centrifuges are assessed as relatively inefficient when operating in production-scale cascades, where a centrifuge in such a cascade achieves an average enrichment output that is only 50-80 percent of the output of a centrifuge operating alone. For more details on inefficiencies and other factors underlying these estimates, the reader is referred to a study by the author.⁸

⁵ This section draws from Albright, "North Korean Plutonium and Weapon-Grade Inventories, End 2014," January 15, 2015 (to be published).

⁶ In practice, nuclear weapons can be made from highly enriched uranium (HEU), which is any enriched uranium which contains 20 percent or more of the key isotope uranium-235. In contrast, WGU is a form of HEU containing 90 percent or more of the isotope uranium-235. Weapons programs seek WGU because a nuclear weapon made from HEU containing 20 percent uranium-235 would require far more HEU than one made from WGU and be substantially larger and heavier, characteristics that make deployment on missiles for example far more difficult, if not impossible.

⁷ David Albright and Paul Brannan, *Taking Stock: North Korea's Uranium Enrichment Program*, Institute for Science and International Security, October 8, 2010.

⁸ "North Korean Plutonium and Weapon-Grade Inventories, End 2014," op. cit. See also *Taking Stock: North Korea's Uranium Enrichment Program*, op. cit.

To better understand the amount of weapons-grade uranium that North Korea could have produced through 2014, two scenarios are considered based on the available evidence. The first assumes that a second centrifuge plant is operating. The second assumes that the Yongbyon plant is the only one.

Both scenarios assume that North Korea is making weapons-grade uranium. Other scenarios are possible, resulting in more or less WGU, but these two are judged as realistic possibilities that do not dramatically over or underestimate the actual WGU stock.

The main characteristics of the two scenarios are:

- **Scenario 1:** North Korea operates two production-scale centrifuge plants, the first of which started production sometime between the end of 2005 and 2010. The first plant is assumed to have produced WGU and contain 2,000-3,000 P2-type centrifuges. The second one is the Yongbyon centrifuge plant, which is assumed to have made LEU for reactor fuel only through 2014. It contains at least 2,000 P2-type centrifuges and could produce WGU but does not. One reason may be that North Korea does not want any evidence of WGU production to be detected by international inspectors in case a negotiated freeze at Yongbyon leads to a monitored shutdown of the centrifuge plant.
- **Scenario 2:** North Korea has only one production-scale centrifuge plant that started in 2010. During 2010 and 2011, the plant made LEU for the ELWR; afterwards, for three years, it produced WGU. This scenario is close to North Korea's public statements about its centrifuge program. The plant is assumed to have 2,000 P2-type centrifuges; additional centrifuges are assumed not to have become operational as of the end of 2014, for example, as a result of the recent expansion in the size of the Yongbyon centrifuge plant.

It is a matter of speculation how North Korea would use WGU in nuclear weapons. It could use the WGU to fashion fission weapons similar to its plutonium-based fission weapons, albeit necessitating more fissile material and a larger-diameter warhead design. Alternatively, North Korea could use WGU in conjunction with plutonium, or a "composite core," to seek fission weapons with a significantly greater explosive yield. The North could also use the WGU with plutonium in designing one-stage thermonuclear explosive devices. The last option is possible in the future with further nuclear tests but unlikely as of 2014. North Korea is likely able to build composite core designs but no evidence of such work has emerged, and this option is also considered unlikely as of the end of 2014.

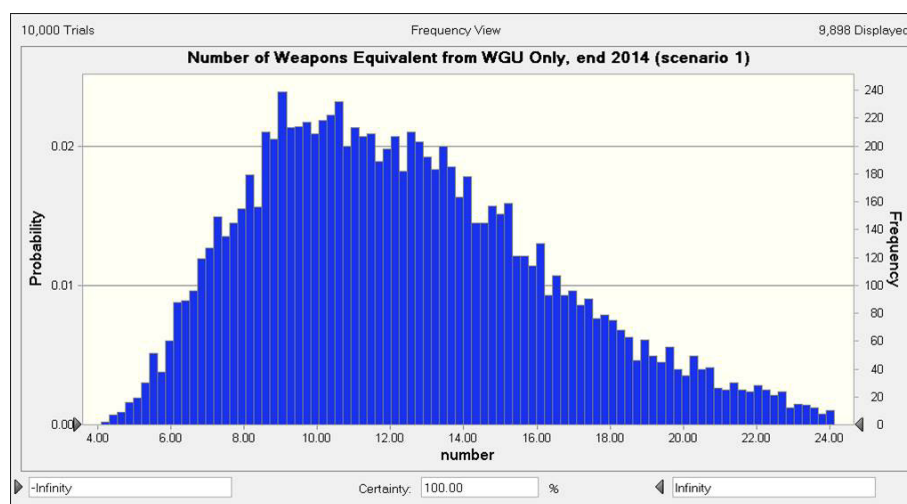
If the WGU were used in crude fission weapons without any plutonium, then North Korea would likely need less than a "significant quantity" (SQ) of WGU. The SQ is technically defined by the International Atomic Energy Agency (IAEA) as the "approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded."⁹ In the case of WGU, which is 90 percent enriched in the isotope uranium-235, a SQ is 25 kg of

⁹ IAEA, "IAEA Safeguards Glossary: 2001 Edition," *International Nuclear Verification Series*, 3, http://www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3_prn.pdf.

uranium 235 in 27.8 kg of WGU.¹⁰ How much less is unclear, but 15-25 kg of WGU per weapon would likely include many possible weapons designs. Over time, the North would likely learn to use less WGU per weapon of a fixed explosive yield, and in later future projections, the lower part of the range will be weighted as more likely.

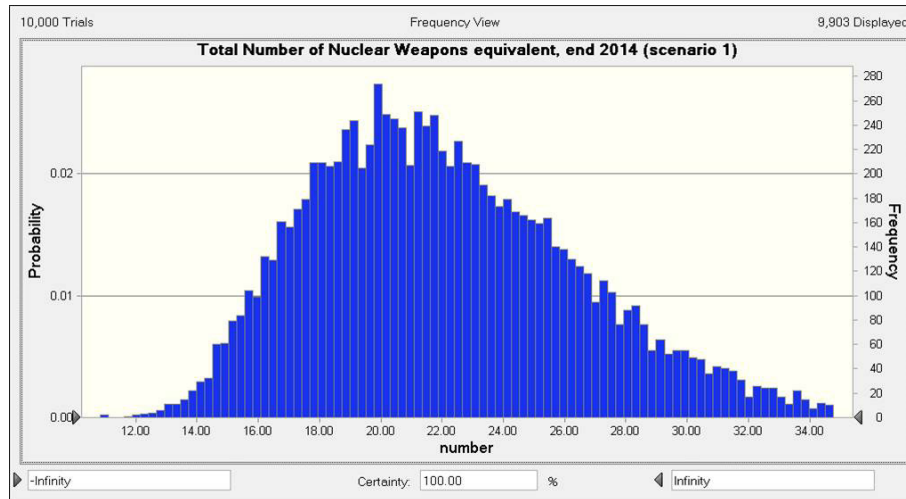
Results of Scenario 1: Two Centrifuge Plants

Using Crystal Ball™ software to perform the calculation, the median estimate of Scenario 1 is about 240 kg of weapons-grade uranium through 2014, with a standard deviation of about 70 kg. With this amount of WGU, the number of nuclear weapons equivalent has a distribution with a median of 12 nuclear weapons equivalents and a standard deviation of about four. The slightly skewed distribution is:



Nuclear weapons can be made from either plutonium or WGU or both combined. To give an indication of the potential number of nuclear weapons equivalent possible, the number of WGU- and plutonium-based nuclear weapons are added independently. The resulting distribution has a median of 22 nuclear weapons equivalent and a standard deviation of 4.5. The distribution is below.

¹⁰ More generally, for highly enriched uranium, which contains 20 percent or more of uranium 235, the SQ is 25 kg of uranium 235. So for 20 percent HEU, the amount of HEU containing one SQ of uranium 235 is 125 kg.

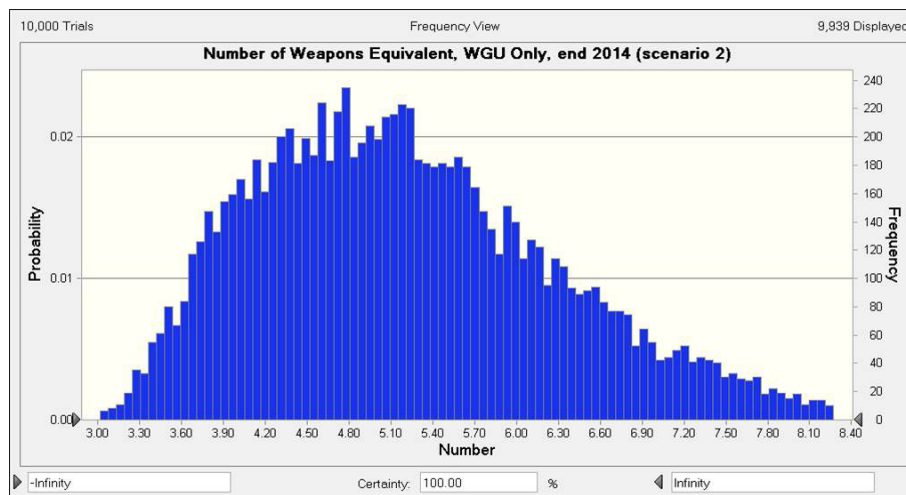


As discussed above, the actual number of nuclear weapons would be expected to be fewer in number, because plutonium and WGU would be held up in the manufacturing processes, lost during processing, or maintained in a reserve. Again, it is assumed that only about 70 percent of the total amount of plutonium and WGU is used in nuclear weapons. Applying this assumption, North Korea would have approximately 15 nuclear weapons with a standard deviation of 3 weapons as of the end of 2014. The number of weapons made from plutonium is estimated at approximately 7 and the number made from WGU is about 8.4, where the latter value is represented as 8-9 weapons.

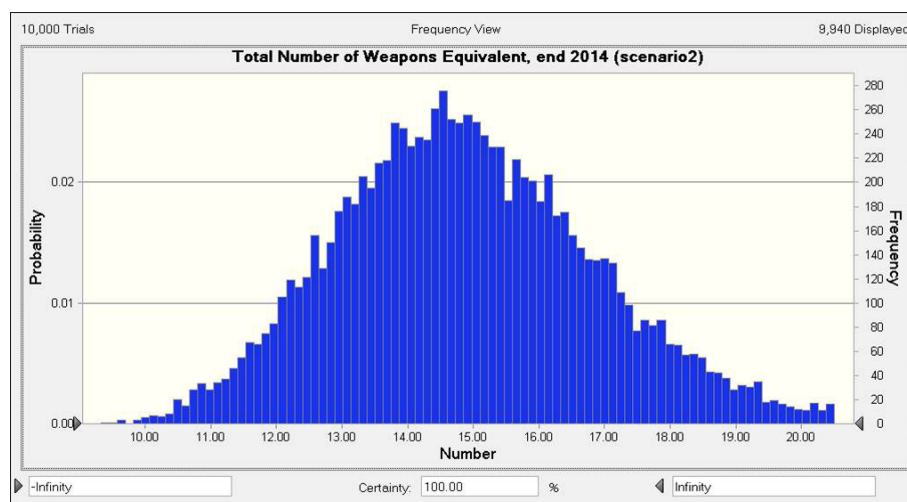
Results of Scenario 2: One Centrifuge Plant

Once again, using Crystal Ball™ software to perform the calculation, the median estimate of Scenario 2 is about 100 kg of weapons-grade uranium through 2014, with a standard deviation of 15 kg.

With this amount of WGU, the number of nuclear weapons equivalent has a distribution with a median of 5 nuclear weapons and a standard deviation of about one. The skewed distribution is below.



As discussed above, nuclear weapons can be made from either plutonium or WGU or both combined. To give an indication of the potential number of nuclear weapons equivalent possible, the number of WGU- and plutonium-based nuclear weapons are added independently. The resulting distribution has a median of 15 nuclear weapons and a standard deviation of 2. The distribution is below.



As previously noted, the actual number of nuclear weapons would be expected to be fewer in number. Again, it is assumed that only about 70 percent of the total amount of plutonium and WGU is used in nuclear weapons. Applying this assumption to the Scenario 2 distribution, North Korea would have approximately 10-11 nuclear weapons with a standard deviation of about 1.4 weapons as of the end of 2014. The number of weapons made from plutonium is estimated at approximately 7 and the number made from WGU is about 3.5. In the latter case of 3.5 weapons, partial nuclear weapons are of course not possible, and the result is represented as 3-4 weapons.

The results of the two scenarios are summarized in the following table.

Table Estimated Number of Nuclear Weapons, Equivalent and Built through 2014 (medians only)		
	Nuclear Weapons Equivalent	Estimated Nuclear Weapons Built
Scenario 1	22	15-16
Scenario 2	15	10-11

Projections through 2020

Over the next several years, North Korea could pursue quantitative and qualitative improvements in its nuclear weapons stockpile. This section lays out a set of projections through 2020 that capture the boundaries of North Korea's possible nuclear arsenal futures.

Regardless of the specific projections, North Korea is expected to continue developing its nuclear weapons capabilities. At the March 31, 2013 plenary meeting of the Workers' Party of Korea, Kim Jong Un said that North Korea "should increase the production of precision and miniaturized nuclear weapons and the means of their delivery and ceaselessly develop nuclear weapons technology to actively develop more powerful and advanced nuclear weapons."¹¹ He implied in this speech that North Korea would seek more precise nuclear-tipped ballistic missiles able to reach the United States.

In this context, North Korea's nuclear program may focus on:

- Increasing production of fissile material and the size of its overall stockpile;
- Conducting more nuclear tests;
- Increasing the explosive yield of its nuclear weapons, including more advanced designs using composite cores or thermonuclear materials to achieve higher yields;
- Achieving additional miniaturization of warheads without sacrificing yield;
- Reducing the amount of plutonium or WGU needed in a nuclear weapon;
- Increasing the safety, security, and reliability of its nuclear weapons although it is highly unlikely to achieve the levels, for example, in the US arsenal;
- Continuing to seek a range of goods abroad for its nuclear programs, including classified and proprietary information; and
- Increasing its level of self-sufficiency in order to avoid restrictions imposed by sanctions and export controls.

Key factors that will affect their ability to make these improvements are:

- Level of political and economic commitment;
- Overcoming technical barriers; and
- Level of foreign assistance.

¹¹ See http://www.ncnk.org/resources/news-items/kim-jong-uns-speeches-and-public-statements-1/KJU_CentralCommittee_KWP.pdf.

Three projections through 2020 are developed in this section:

- ***Low-end Projection through 2020:*** Progress is slow as economic and technical constraints are numerous (including no further nuclear tests); difficulties are encountered in advancing current nuclear efforts and the North's political commitment wanes.
- ***Medium Projection through 2020:*** This projection assumes moderate growth based on a continuation of its current nuclear trajectory and development practices as well as political and economic commitment. The program is a mixture of successes and failures. Efforts to acquire technology/assistance from abroad make slow progress as does Pyongyang's effort to achieve self-sufficiency.
- ***High-end Projection through 2020:*** The general assumption underlying this projection is that nuclear weapons progress is steady and successful. North Korea steps up its commitment to build a nuclear arsenal, vigorously pursues technology development through, in part, increasing the number of nuclear tests and faces few economic constraints. Pyongyang also achieves a high level of success in acquiring technology/assistance from abroad as well as in achieving self-sufficiency.

Low-end Projection through 2020

North Korea's production of fissile material is limited to the 5 MWe reactor and centrifuge plant at Yongbyon. It either does not or cannot militarize the ELWR to make weapons-grade plutonium. The centrifuge plant is limited to 3,000-4,000 P2-type centrifuges, and North Korea does not deploy any more advanced than the P2-type. Moreover, the North will need to produce LEU for the ELWR. The centrifuges operate with poor efficiency, as they have done up through 2014.¹² The 5 MWe reactor will experience outages and poor operational efficiencies, limiting production to an average of 2-3 kg per year of weapons-grade plutonium.

In this scenario, Pyongyang does not conduct any further nuclear tests. Nonetheless, it would make limited advances in its nuclear weapons skills and designs, such as achieving some additional miniaturization of warheads without sacrificing the explosive yield. However, the North would not be able to reduce the amount of plutonium or WGU needed in a nuclear weapon. Marginal improvements would be made in the safety, security and reliability of its nuclear weapons. Finally, without testing there would be limits to developing more advanced weapons. The North would be limited to using shells of fissile material or other shapes for the core that would permit significant additional miniaturization. It would be unable to develop boosted or thermonuclear weapons as well as a reliable source of tritium for thermonuclear devices.

North Korea's arsenal would be limited to fission-only weapons made from either plutonium or WGU. The explosive yields would not be high, likely on order of 10 kilotons. Its arsenal would involve a small number of weapon designs, or physics packages, and they would be adapted to various delivery systems, such as the Nodong and possibly longer-range missiles.

¹² The centrifuge efficiency is taken as 50-80 percent.

While Pyongyang will require foreign goods for its various nuclear programs, such as vacuum equipment, pumps, instrumentation, sophisticated computer numerical controlled (CNC) machine tools and specialized chemicals and metals, it will experience difficulty procuring them. These procurement challenges will reduce the efficiency of its centrifuges and 5 MWe reactor. Moreover, the North will not succeed in procuring nuclear weapons data or designs overseas that would help further modernize its stockpile. Any nuclear cooperation with other countries—such as Iran—would be minimal and achieve few results.

Low-end Nuclear Arsenal. By 2020, North Korea would modestly increase the size of its nuclear arsenal, which would be comprised of fission weapons with explosive yields of about 10 kilotons. Miniaturization would allow the North to mount nuclear weapons on ballistic missiles but limited to existing types like the Nodong and a Taepodong deployed as an ICBM. Each weapon would be made from either separated plutonium or weapons-grade uranium. The stockpile would not include any composite cores or thermonuclear nuclear weapons.

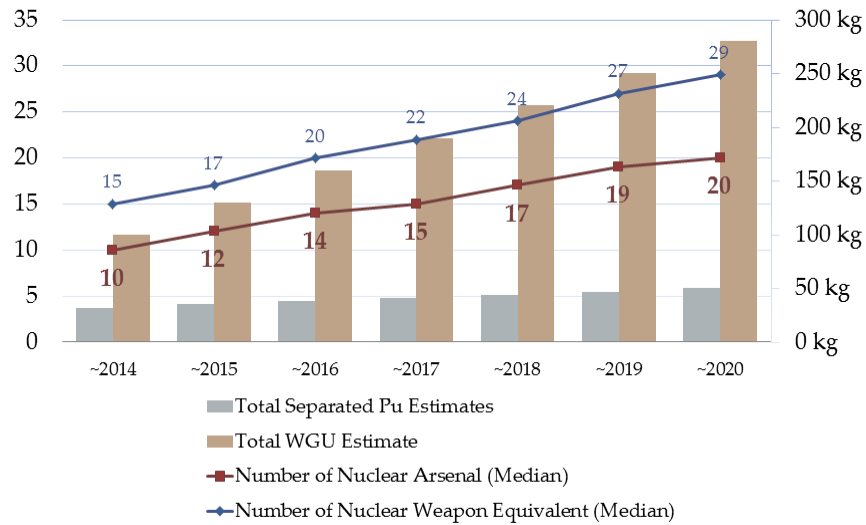
To derive the total amounts of plutonium and weapons-grade uranium through 2020, the amounts of plutonium and weapons-grade uranium produced through 2014 under Scenario 2 (one centrifuge plant) are added to the values from the period 2015-2020, where the assumptions above are used to derive inventories in the latter period with the Crystal Ball™ software.

The median of the total plutonium estimates through 2020 is 50 kg with a standard deviation of 2 kg. The median of the WGU estimate through 2020 is 280 kg with a standard deviation of 60 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is 29 with a standard deviation of 5.¹³ About half of these weapons contain plutonium and half contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of about 2.3 weapons equivalent per year.

Only a percentage of plutonium and WGU is used in the actual weapons—some will be tied up in the manufacturing process, lost to waste, or held in a reserve. In the low-end projection, with about 70 percent of the plutonium and WGU used in the weapons, the DPRK's total arsenal will consist of approximately 20 fission nuclear weapons at the end of 2020.

¹³ A plutonium-based weapon is assumed to contain 2-5 kg of weapons-grade plutonium, with the values between about 3-4 weighted, and a WGU-based weapon contains 15-25 kg of weapons-grade uranium, with each value in this range equally likely.

Illustrative **Low-end** Threat 2020 Nuclear Arsenal: 100% Increase



Medium Projection through 2020

North Korea operates the 5 MWe reactor reasonably well, producing an average of about 3-4 kg of weapons-grade plutonium per year. The ELWR is partially militarized and makes a moderate amount of weapons-grade plutonium—5 to 10 kg—each year. The plutonium from the ELWR will become available starting in 2018.

North Korea operates two centrifuge plants limited to a total of 6,000-7,000 P2-type centrifuges throughout this period. Moreover, the Yongbyon plant will need to produce LEU for the ELWR. The centrifuges will continue to work with relatively poor efficiency, but better than in the low-end projection.¹⁴ North Korea will conduct development work on a centrifuge similar to the Pakistani P3-type centrifuge, which has four maraging steel segments and three bellows, giving an output double the P2-type centrifuge. Nonetheless, during this period the North does not deploy any advanced centrifuges.

In this scenario, North Korea conducts nuclear tests at its current rate of about one every 3-4 years. Advances are made in nuclear weapons development skills and designs, such as achieving additional miniaturization of warheads without sacrificing explosive yield. The North makes progress in using shells of fissile material instead of solid core designs and developing non-spherical shapes of the plutonium or WGU core, allowing further miniaturization. However, it does not reduce the amount of plutonium or WGU needed in a weapon. Improvements are also achieved in the safety, security and reliability of the North's stockpile.

¹⁴ Here the centrifuge efficiency is 60-80 percent.

The North develops and deploys an additional weapon design that contains plutonium and weapons-grade uranium in the same core, allowing a significant increase in the weapon's explosive yield up to 50 kilotons. Fission weapons with either plutonium or weapons-grade uranium will remain the majority of its stockpile. However, their yields are larger on average, in the range of 10-20 kilotons, another benefit of continued nuclear testing and advances in design skills.

By the end of 2020, advances in miniaturization will result in a stockpile of warheads that can be deployed on missiles of various ranges beyond those in the low-end projection, including shorter-range ballistic missiles for battlefield use or more modern intermediate-range ballistic missiles (IRBMs) and ICBMs such as the Musudan and KN-08 road-mobile missiles.

In addition, Pyongyang will develop a more advanced nuclear weapon design although it will not be fully tested or deployed by 2020. It will develop a reliable but small source of tritium and deuterium. Both could be used to boost the explosive yield of a fission weapon and to achieve a one-stage thermonuclear weapon, which uses tritium, deuterium and lithium within a composite core of plutonium and weapons-grade uranium. The North will be able to test these designs, likely with a reduced yield because of test site limitations.

North Korea will continue to require foreign goods for its various nuclear programs but will experience only mixed success in procuring them. Progress will be made in producing some key materials and equipment domestically. Nonetheless, overseas procurement failures will reduce the efficiency of its centrifuges, reactors, and nuclear weapons program, but not as severely as in the low-end projection. While the North will not succeed in procuring nuclear weapons data or designs overseas, it will benefit from limited nuclear cooperation with Iran, which will aid Pyongyang's centrifuge program and procurement efforts.

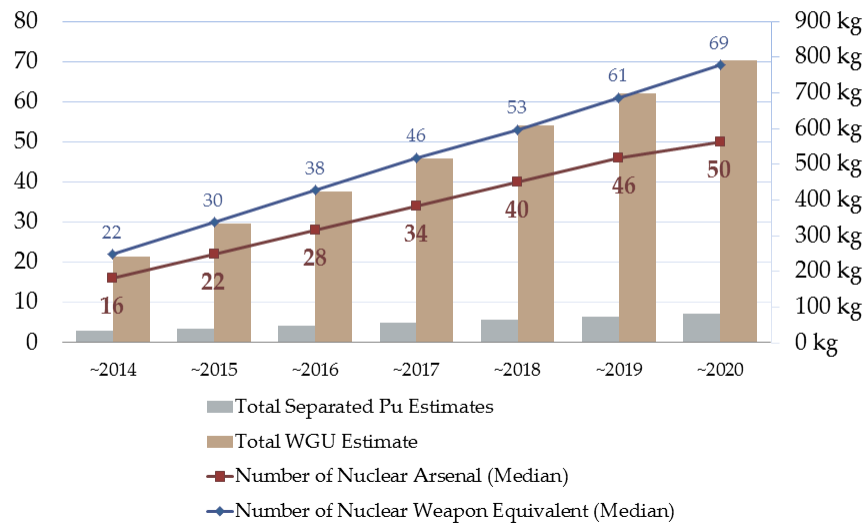
Medium Nuclear Arsenal. By 2020, North Korea would increase the size of its nuclear arsenal several fold. The arsenal would consist of mostly fission weapons with explosive yields of about 10-20 kilotons. Several will have composite cores. These weapons could be mounted on a wide range of delivery systems.

The total amounts of plutonium and weapons-grade uranium is based on the amount of plutonium and weapons-grade uranium produced through 2014 under Scenario 1 (two centrifuge plants) added to the values from the period 2015-2020, where the assumptions above are used to derive inventories in the latter period with Crystal Ball™ software. The median of the total plutonium estimates through 2020 is 80 kg with a standard deviation of 5 kg. The median of the WGU estimate through 2020 is 790 kg with a standard deviation of 105 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is 69 with a standard deviation of 8.¹⁵ About one-third of these weapons contain plutonium and two-thirds contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of almost eight weapons equivalent per year.

¹⁵ A plutonium-based weapon is assumed to contain 2-5 kg of weapons-grade plutonium, with the values from about 3-4 weighted, and a WGU-based weapon contains 15-25 kg of weapons-grade uranium, with each value in this range equally likely.

In this scenario, less fissile material is assumed to be tied up in-process or lost in waste than in the low-end estimate. In addition, some of the plutonium and WGU will be in nuclear weapons composite cores (say <5 weapons), reducing the total number of weapons as derived above, where each weapon is assumed to contain only plutonium or WGU. On balance, in the medium projection, the number of nuclear weapons is assumed to be about 75 percent of the nuclear weapons equivalent, giving an arsenal of about 50 nuclear weapons.

Illustrative **Medium** Threat 2020 Nuclear Arsenal: 212.5% Increase



High-end Projection through 2020

In this projection, North Korea operates the 5 MWe reactor efficiently, making use of overseas procurements that allow an increase in reactor power to 25 MWth and effective maintenance. The result is an average production of about 5-6 kg of weapons-grade plutonium per year. Pyongyang militarizes the ELWR, enabling it to produce more weapons-grade plutonium than in the previous scenario, 15-20 kg each year. Also, the plutonium would become available two years earlier, starting in early 2016.

North Korea will operate two centrifuge plants with a combined 8,000-9,000 P2-type centrifuges. One will be the Yongbyon centrifuge plant with a capacity of 4,000 P2-type centrifuges starting at the beginning of 2015. The other will be an upgraded centrifuge plant at another location containing 4,000-5,000 P2-type centrifuges operating at this level in early 2015. As before, the Yongbyon centrifuge plant will need to produce LEU for the ELWR. The reactor will achieve higher capacity factors than in the medium scenario. The centrifuges will work with better efficiency than in the previous projections.¹⁶ Moreover, the North will complete development work on a new centrifuge similar to the Pakistani P3-type, with an output that is double that of

¹⁶ The centrifuge efficiency is 70-80 percent.

the P2-type centrifuge. The first 2,000 P3-type centrifuges will become operational at the start of 2019. These centrifuges will be in addition to 8,000-9,000 P2-type centrifuges already in operation.

Under this scenario, nuclear weapons tests are increased to a rate of one per year enabling the North to make significant advances in its nuclear weapons skills and designs. It develops smaller diameter, lighter-weight nuclear weapons able to fit an increasing variety of shorter range missiles for battlefield use. Pyongyang is able to make further reductions in the amount of plutonium and WGU used in a nuclear weapon.¹⁷ It makes significant improvements in the safety, security and reliability of its nuclear weapons, allowing nuclear weapons to be deployed more easily.

As in the medium scenario, additional designs that contain plutonium and weapons-grade uranium in the same core are developed and deployed, allowing a significant increase in explosive yield up to 50 kilotons. The North also continues to field weapons with either plutonium or weapons-grade uranium, as in the two other projections. But in the high-end scenario, it increases the average yield of its fission weapons to 20 or more kilotons.

While developing a reliable source of tritium and deuterium for nuclear weapons development, the North makes significant progress in using both to boost the explosive yield of a fission weapon. A new boosted yield design is tested and incorporated into a significant number of composite core weapons although the bulk of the stockpile remains centered on weapons using either plutonium or uranium.

Pyongyang also develops a one-stage thermonuclear weapon, which uses tritium, deuterium and lithium within a composite core of plutonium and large quantities of weapons-grade uranium. One such device is tested by 2020, with a yield of about 100 kilotons. However, this one-stage weapon is too large for missile delivery, but North Korea is aiming to make it deployable as soon as possible. Work is done on designing and developing a two-stage thermonuclear weapon but not tested by 2020.

North Korea will be very successful in procuring foreign goods for its various nuclear programs and will achieve greater self-sufficiency in making key materials and equipment domestically. Procurements, whether domestic or abroad, will be adequate and not interfere with the programs' progress. Moreover, Pyongyang will succeed in procuring nuclear weapons data and an advanced weapon design overseas, making an important contribution to speeding up the North's nuclear weapons developments. It cooperates actively with Iran on all nuclear areas, reducing inefficiencies in facilities and bottlenecks in procurements.

High-end Nuclear Arsenal. By 2020, North Korea would increase the size of its nuclear arsenal many fold. The arsenal would still consist of mostly fission weapons but the explosive yields would average 20 kilotons or more, which is greater than in the medium estimate. Several will have composite cores and North Korea will be working to deploy one-stage thermonuclear

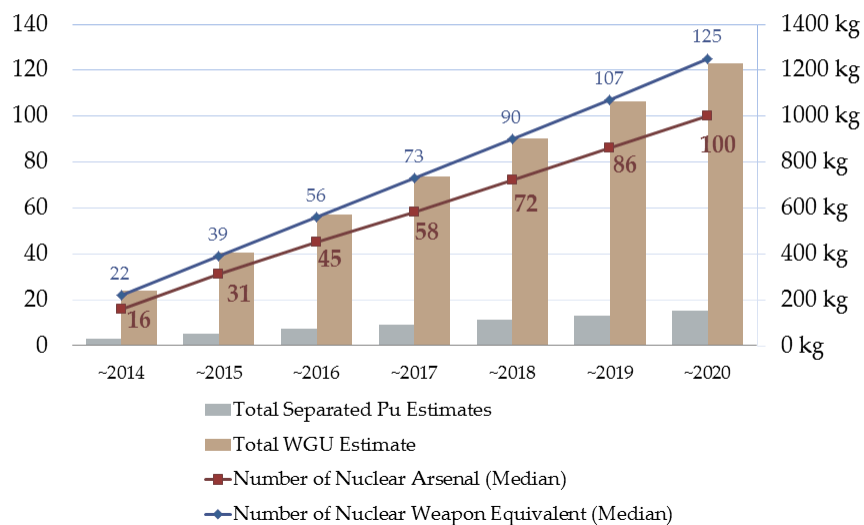
¹⁷ For plutonium, the range is 2-4 kg, where mid-values are weighted and for WGU the range is 15-20 kg, where each value is equally probable.

weapons with yields of about 100 kilotons. With the exception of thermonuclear weapons, the North's arsenal could be mounted on a wide range of delivery systems from short-range ballistic missiles (SRBMs) to the newer road-mobile Musudan IRBM to the KN-08 ICBM.

To derive the total amounts of plutonium and weapons-grade uranium through 2020, plutonium and weapons-grade uranium produced through 2014 under Scenario 1 (two centrifuge plants) are added to the values from the period 2015-2020, where the above assumptions are used to calculate inventories in the latter period. The median of the total plutonium estimates through 2020 is 154 kg with a standard deviation of 8 kg. The median of the WGU estimate through 2020 is 1,230 kg with a standard deviation of about 110 kg. Assuming that each weapon contains either plutonium or WGU, the median of the number of nuclear weapon equivalents is about 125 with a standard deviation of 13. About 40 percent of these weapons contain plutonium and 60 percent contain WGU. From 2014 through 2020, the number of weapon equivalents grows at an average rate of about 17 per year.

In this projection, much less fissile material is assumed to be tied up in-process, lost to waste, or held in reserve than in the medium scenario. However, a couple factors reduce the number of weapons made from plutonium and WGU. An increased number of composite cores, namely 5-10, will contain plutonium and WGU, and one test of a single-stage thermonuclear device will have used several tens of kg of WGU. On balance, the number of nuclear weapons is taken as 80 percent of the nuclear weapons equivalent. The end result is an arsenal of about 100 nuclear weapons.

Illustrative High-end Threat 2020 Nuclear Arsenal: 525% Increase



A Final Word

The three scenarios are by no means all the possible paths of development for North Korea's nuclear weapons program. There are, of course, a number of unpredictable different ways that its program might develop over the next 5-10 years. Rather, by laying out what may be the worst and best case analysis, these scenarios capture a band that has a greater chance of predicting the future than focusing on any one probable outcome.

In this context, it is worth noting one additional scenario, namely that North Korea ends nuclear testing but continues and perhaps accelerates its production of fissile material. Under this scenario, Pyongyang's nuclear weapons stockpile could continue to grow to as much as the 50-100 weapons outlined in the medium and high-end scenarios above with very limited qualitative improvements in that stockpile. Moreover, despite its technological limits, given the assessment of Pyongyang's current level of miniaturization, such a stockpile would be able to arm a large number of selected delivery systems in the North's inventory, particularly the Nodong medium-range ballistic missile (MRBM) able to reach South Korea and Japan.

2020 through 2025

After 2020, North Korea could further increase its numbers of nuclear weapons beyond those in the three scenarios and improve their destructive qualities, including further developing thermonuclear weapons. Even in the low-end scenario, North Korea may simply build more fission weapons with plutonium and WGU, slowly growing its arsenal of deployed nuclear weapons at the same rate as in 2015-2020.

In the medium and high-end scenarios, Pyongyang's arsenal would be expected to grow at a faster rate, mainly due to production of more WGU. The increase would result from the deployment of more centrifuges, including more advanced ones. After 2020, even in the medium scenario, North Korea is likely to deploy more advanced centrifuges. With greater numbers of centrifuges, including a growing fraction of more powerful ones, North Korea's rate of WGU production would grow.

North Korea's nuclear weapons would likely become more sophisticated across the board in both the medium and high-end scenarios, as underground tests continue and the North's nuclear weapons experience matures and grows. Particularly, in the high-end scenario, Pyongyang would be expected to deploy an increasing number of more accurate long-range missiles and a growing variety of shorter range battlefield weapons. It would also likely be able to finish developing and then deploying a one-stage thermonuclear weapon with a yield of about 100 kilotons. Also, it may make significant progress in developing two-stage thermonuclear weapons.

**Table: Nuclear Futures, through 2020.
Characteristics and Projection Estimates**

Characteristics and Estimates	Low-End	Medium	High-End
5 MWe Reactor (kg Pu/yr)	2-3 kg/yr	3-4 kg/yr	5-6 kg/yr
ELWR (kg)			
Year When Militarized	not applicable (n/a)	2018	2016
How Much Pu/yr	n/a	5-10 kg/yr	15-20 kg/yr
Centrifuge Plants			
Number	1	2	2
# P2 Centrifuges	3,000-4,000	6,000-7,000	8,000-9,000
Efficiency of P2s	0.5-0.8	0.6-0.8	0.7-0.8
Advanced Centrifuges	n/a	n/a	2,000 P3
Year Deployed	n/a	n/a	Start 2019
End 2014 Stock (kg)			
Plutonium	30-34 kg	30-34 kg	30-34 kg
WGU	85-115 kg	170-310 kg	170-310 kg
End 2020 Stock (kg)			
Plutonium	48-52 kg	75-85 kg	146-162 kg
WGU	220-340 kg	685-895 kg	1,120-1,340kg
Nuclear Testing	none	1 every 3-4 years	annually
Amount in Each Weapon			
Plutonium	2-5 kg	2-5 kg	2-4 kg
WGU	15-25 kg	15-25 kg	15-20 kg
Weapon Equivalents (median only)			
End 2014	15 weapons eq.	22 weapons eq.	22 weapon eq.
End 2020	29 weapons eq.	69 weapons eq.	125 weapons eq.
Arsenal Size, end 2020	20 weapons	50 weapons	100 weapons
Yield of Pu or WGU			
Fission Weapon	10 kilotons	10-20 kilotons	20+ kilotons
Composite Core Weapons	n/a	<5	5-10
Thermonuclear Weapons	n/a	n/a	0 deployed

US·KOREA INSTITUTE AT SAIS

US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

North Korea's Nuclear Futures: Technology and Strategy

JOEL S. WIT
SUN YOUNG AHN

FEBRUARY 2015

A stylized map of North Korea is outlined in a bright blue, jagged line. The map is set against a dark blue background that features a grid of lighter blue squares. Overlaid on the map is a series of concentric circles, resembling a radar or sonar display, with a central blue circle. The overall design is modern and technological.

NORTH KOREA'S
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Joel S. Wit, concurrently a Senior Fellow at the US-Korea Institute (USKI) at the Johns Hopkins School of Advanced International Studies (SAIS) and an adjunct Senior Fellow at Columbia University's Weatherhead Institute for East Asia, is the co-founder of "38 North" (www.38north.org) and the project lead. An internationally recognized expert on Northeast Asian security issues and non-proliferation, Mr. Wit has 20 years of experience in the US State Department and the Washington think-tank arena. In 1993, he joined the staff of Ambassador Robert L. Gallucci and was an important player in reaching the 1994 US-North Korea Agreed Framework. From 1995-2000, Mr. Wit was the State Department Coordinator for implementation of that agreement, playing a key role in the formation of KEDO and its operations as well as working with North Korea on other aspects of the Agreed Framework. He has written numerous articles on North Korea and non-proliferation including, "US Strategy Towards North Korea: Rebuilding Dialogue and Engagement," published by Columbia University and the US-Korea Institute at SAIS. Mr. Wit is also the co-author of the book, *Going Critical: The First North Korean Nuclear Crisis*.

Sun Young Ahn is currently working as a Research Assistant at the US-Korea Institute (USKI) at the Johns Hopkins School of Advanced International Studies (SAIS). She is a recent graduate from Georgetown University's Edmund A. Walsh School of Foreign Service with an M.A. in Security Studies. She received her B.A. in Political Science from the University of British Columbia in 2009. Her areas of interest primarily lie in international security issues associated with nuclear and missile proliferation. Her current research focuses on North Korea's nuclear and missile programs, inter-Korean relations, US-ROK alliance and geopolitics of East Asia.

North Korea's Nuclear Futures: Technology and Strategy

**JOEL S. WIT
SUN YOUNG AHN**

FEBRUARY 2015

**NORTH KOREA'S
NUCLEAR FUTURES SERIES**

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EXECUTIVE SUMMARY

North Korea's Nuclear and Missile Programs Poised for Expansion

Pyongyang's nuclear and missile programs appear poised for significant expansion over the next five years, presenting a serious challenge to the United States, Northeast Asia and the international community.

That expansion will benefit from accomplishments achieved from 2009 until 2014, banner years for Pyongyang's nuclear and missile programs. Aside from obvious manifestations—two nuclear and three long-range rocket tests—Pyongyang has conducted other important activities including advances in the development of nuclear weapons, modernization and expansion of the fissile material production infrastructure, the appearance of new road-mobile intermediate-range and intercontinental ballistic missiles and possibly sea-based cruise and ballistic missiles, the development of a rocket larger than the Unha space launch vehicle (SLV) that may have military applications and the modernization of Pyongyang's missile development testing and production infrastructure.

While the scope of activity does not necessarily mean that all of these programs will result in the deployment of more and newer weapons, it is a disturbing indicator of a vibrant and extensive effort to build a larger nuclear arsenal and more capable missile delivery systems.

Impending Rapid Growth of the Nuclear Weapons Stockpile

Pyongyang's current stockpile is estimated to consist of 10-16 weapons, including 6-8 devices fashioned from plutonium and 4-8 from weapons-grade uranium (WGU). This range reflects uncertainty over the number of plants producing WGU (1 or 2), the number of centrifuges employed and the efficiency of their operation.

The plutonium-based weapons have been miniaturized sufficiently to be mounted on the Nodong medium-range ballistic missile (MRBM) and on the Taepodong-2 missile, which can achieve intercontinental ranges. This judgment is based on the reality that North Korea has been working on such warheads for almost 30 years, and may have received relevant designs from the A.Q. Khan nuclear smuggling network in the 1990s or earlier from China, as Pakistan did in the early 1980s.

Devices based on weapons-grade uranium may be slightly less advanced with a larger diameter, making it difficult to mount them on a Nodong MRBM. However, that objective can be accomplished relatively quickly through continued design work and does not require further nuclear testing.

Since predicting the growth of the North's nuclear stockpile is a difficult task, the project has devised three scenarios based on different technical, political and other assumptions. These projections indicate that North Korea's nuclear stockpile could expand at a rate of anywhere from 100 percent in the best case scenario to 525 percent in the worst case scenario by 2020. The three scenarios are:

1. ***Minimal Growth, Minimal Modernization:*** North Korea's stockpile grows slowly and technological improvements are minimal. The stockpile increases from a current low level of 10 weapons to 20 weapons by 2020. Further miniaturization is also minimal and yields of the weapons remain essentially 10 kilotons, the same as in the baseline stockpile.
2. ***Moderate Growth, Moderate Improvement:*** A continuation of North Korea's current trajectory. In this scenario Pyongyang's stockpile grows from current levels to 50 weapons by 2020, an increase of 212.5 percent. Further advances in miniaturization enable the North to mount warheads on a new generation of road-mobile intermediate-range ballistic missiles (IRBMs) and intercontinental ballistic missiles (ICBMs) as well as shorter-range ballistic missiles (SRBMs). Yields of existing weapons increase to the 10-20 kiloton range while new designs using both plutonium and uranium enter the stockpile and achieve 50 kiloton yields. The North may develop and partially test but not deploy an even more advanced single-stage thermonuclear design.
3. ***Rapid Growth, Rapid Improvement:*** North Korea's nuclear stockpile grows more rapidly than in the previous scenarios to 100 weapons by 2020, an increase of 525 percent. Significant advances are made in weapons designs allowing the North to deploy battlefield and tactical weapons if it chooses to do so. The average stockpile yield increases to 20 or more kilotons with an increasing number having yields of 50 kilotons. A one-stage thermonuclear device with a yield of 100 kilotons is tested but is too large to be deployed. Work is done on developing a two-stage thermonuclear device.

One last scenario seems relevant in predicting the future of North Korea's nuclear stockpile: namely, North Korea could end nuclear testing but continue and perhaps accelerate the production of fissile material. Under this scenario, North Korea's nuclear stockpile could reach as many as the 100 weapons outlined above with very limited qualitative improvements. Nevertheless, given Pyongyang's current technological know-how, such a stockpile would be able to arm selected delivery systems, particularly the Nodong MRBM able to reach targets in South Korea and Japan.

New Delivery Systems Possible if Significant Challenges are Solved

While North Korea's delivery systems are able today to reach most targets in Northeast Asia, particularly in South Korea and Japan, activities over the past five years indicate that Pyongyang has bigger ambitions and is seriously pursuing the development of more capable systems. However, the future of this effort remains more uncertain than in the nuclear program given technological, engineering and other challenges facing Pyongyang.

The backbone of North Korea's current force of 1,000 ballistic missiles is the Nodong MRBM, a mobile, survivable, and reliable missile accurate enough to attack cities, ports and military bases. Supplementing that missile is a large stockpile of SCUD ballistic missiles that can carry a nuclear payload 300-600 kilometers, a newer shorter-range ballistic missile, the KN-02 Toksa, notable because its solid-fuel allows the system to be more survivable and responsive and a small force of light bombers.

Despite its regional focus, Pyongyang may also be able to field a limited number of Taepodong missiles—a militarized version of the Unha space launch vehicle—in an “emergency operational capability” that can reach targets in the United States. These weapons would be highly vulnerable since they would probably be based on an above ground launch pad, have low reliability since only one flight test of the Unha has been successful and would suffer from a lack of testing of reentry vehicles necessary for long-range missiles carrying nuclear warheads. However, it is worth noting that early US missiles were deployed with inaccurate “blunt body reentry vehicles” that did not require flight testing. Overall, while perhaps not an effective operational weapon, deployment of the Taepodong would clearly send a political message to Pyongyang's adversaries but the possibility that the missile might work could not be ignored.

Four key activities from 2009-2014 are important indicators of the North's future objectives for its delivery systems:

1. The development of new road-mobile missiles with greater ranges to signal an intention to withstand preemption, to provide more significant retaliatory options and to target American bases in Guam and the continental United States;
2. A possible effort to develop short-range sea-based missiles that increase survivability, expand the threat to theater targets and complicate defense planning since mobile platforms can attack from any direction;
3. The development of a larger space launch vehicle that could contribute to the further development of longer-range ballistic missiles; and
4. Further development of solid-fuel rocket technology through enhancing the range of the KN-02 SRBM that could yield greater mobility and survivability in future longer-range solid-fuel missiles.

The challenges Pyongyang faces in moving forward with these programs are likely to prove difficult to overcome. Progress will require solving significant technological and engineering problems, particularly since the North is not self-sufficient in missile development and production. Foreign assistance will be essential in acquiring and operationalizing a number of

critical technologies. Nevertheless, it is worth noting that North Korea, like other small nuclear powers, may have a far less demanding definition of success than the United States, which tests missiles extensively before they become operational.

As in the nuclear projections, three scenarios for the development and deployment of delivery systems reflecting different political, economic, technological and other assumptions help bound future possibilities:

1. ***Minimal Modernization:*** Delivery systems remain essentially the same as today with two possible developments. First, North Korea could deploy short-range sea-launched cruise and ballistic missiles on surface ships or submarines. These missiles would be based on existing weapons, possibly the KN-01 naval cruise missile or the KN-02 ballistic missile. Second, Pyongyang could deploy the Musudan IRBM in an emergency operational capability to demonstrate resolve. Despite the fact that the Musudan has not been flight tested by the North, it has already conducted extensive development activities that might allow such a deployment. Indeed, the system may have already been deployed in the field in an emergency during the 2013 crisis on the Korean peninsula if media reports are accurate.
2. ***Steady Modernization:*** North Korea continues its current development and deployment path resulting in an increasing theater threat plus the emergence of an intercontinental threat to the United States by 2020. In the theater, greater numbers of sea-based systems are deployed and Pyongyang may develop an emergency operational capability to field a ballistic missile submarine. Also, in this scenario, the Musudan IRBM becomes an operational system after a limited number of flight tests. With regard to intercontinental developments, the KN-08 ICBM could become available on an emergency basis as it moves towards becoming an operational weapon. One additional possibility is the deployment of Taepodong ICBMs in more survivable hardened missile silos, a technology the North has employed for large radars and surface-to-air missiles since the late 1960s and explored for ballistic missiles since the early 1990s.
3. ***Maximum Modernization:*** North Korea accelerates the development and deployment of new systems, resulting in a growing theater and intercontinental threat that emerges more rapidly than in the previous scenario. In the theater, this will mean greater deployments of the Musudan IRBM, the development of a more survivable, accurate 300 kilometer range solid-fuel missile to replace the SCUD and possibly the deployment of North Korea's first operational ballistic missile submarine. On the intercontinental level, the DPRK would field an operational KN-08 road-mobile ICBM in growing numbers.

An Evolving Nuclear Strategy

Pyongyang's nuclear strategy—its plans for how to use these weapons in wartime and how to communicate its plans in peace time in order to deter opponents—is a work in progress and difficult to predict, particularly given uncertainties about the growth of North Korea's nuclear and missile forces over the next five years. Nevertheless, an examination of the evolution of

North Korean thinking on nuclear weapons, of its defense strategy over the past five decades and specific investments made in its nuclear and missile programs can provide important clues as to the future.

North Korea's evolving nuclear strategy reflects five overriding principles: 1) the maintenance of the Kim family leadership; 2) elimination of all internal threats to the leadership; 3) deterrence of the United States and South Korea; 4) economic development of the nation; and 5) reunification of the Korean peninsula.

Confronted with external security threats—particularly from the United States and its nuclear arsenal—the country's leadership and the Korean People's Army (KPA) devised a strategy that appears to have evolved over time in response to changing external and internal circumstances. Until 1989, before North Korea's nuclear program began to emerge, Pyongyang's strategy was based on the threat of using chemical weapons combined with defensive measures such as the construction of underground facilities to deter and defend against a nuclear attack. That threat was subsequently supplemented by expanding large conventional armed forces and emerging asymmetric capabilities such as special operations forces and ballistic missiles.

As Pyongyang's nuclear program advanced and missile and aircraft delivery systems were acquired the KPA initiated a systematic study of US, Soviet and Chinese nuclear warfare concepts and strategies. By 1989, a rudimentary deterrence strategy may have emerged focused on the political and diplomatic utility of nuclear weapons rather than as tools to fight a conflict. During this period, Kim Il Sung is reported to have first stated that nuclear weapons could not be used on the Korean peninsula due to its small size. Moreover, North Korea's willingness to become a signatory to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) may have reflected the view that these weapons might have limited utility.

Through the 1990s until the early 2000s, a particularly tumultuous period in North Korean history, Pyongyang chose to capitalize on the political and diplomatic utility of nuclear weapons by accepting crippling limits on its plutonium-based fissile material program in return for a better relationship with the United States that would diminish external security threats. However, by the late 1990s, the North probably concluded that its chemical weapons would not deter US nuclear use on the peninsula given Iraq's rapid defeat in the 1990 Gulf War and may have jumpstarted a covert program to enrich uranium. The collapse of efforts to improve relations with the United States in the early 2000s led to the adoption of a new deterrence strategy that probably reflected the KPA's study of other country's approaches and the emergence of an emergency nuclear capability consisting of a handful of weapons. North Korean rhetoric focused on the use of overwhelming artillery, conventional ground forces and ballistic missiles as well as Pyongyang's "right to possess nuclear weapons as a deterrent to the US nuclear threat."

A further evolution of North Korea's strategy, was spurred on by the acceleration of nuclear and missile programs during the last years of Kim Jong Il's rule but also by external events—the 2007 destruction of a North Korean reactor under construction in Syria by an Israeli airstrike and the 2011 US-led attack on Libya eight years after that country gave up its WMD programs. Not only has Pyongyang taken political steps to enshrine the importance of nuclear weapons in ensuring its security, but also other important developments point to the possible elaboration

of requirements for effective deterrence to include credible options for their use in a range of contingencies. These developments include the establishment of a new high-level Strategic Force Command for its missile forces, the development of more survivable weapons systems better able to fulfill deterrence mission, significant strides in the production of more miniaturized weapons and an increasing number of ballistic missile exercises that are applicable to both the use of conventional and nuclear weapons in wartime.

The past five years have also witnessed a new sophistication in the North's articulation of its nuclear weapons strategy for both external and internal audiences, particularly the practical military application of these weapons and their utility in pursuing political priorities. Much of the rhetoric is very similar to US and Russian terminology with nuclear weapons usage characterized in battlefield, operational and strategic terms. However, while these statements on the surface suggest a significant evolutionary step in the North's thinking about deterrence and nuclear strategy, they may also be understood as political rhetoric employed to mimic US statements or an aspirational objective of KPA planners given the small size of the North's nuclear stockpile and limited capabilities of its delivery systems.

All of these developments would seem to indicate that Pyongyang is striving for a policy of deterrence based on a more credible assured retaliation capability. This approach is reflected in North Korea's policy adopted by the Supreme People's Assembly (SPA) in 2013: "[Nuclear weapons] serve the purpose of deterring and repelling the aggression and attack of the enemy against the DPRK and dealing deadly retaliatory blows at the strong holds of aggression...."

The key question for the future is whether Pyongyang has ambitions to establish deterrence based on a strategy beyond assured retaliation that includes options for the limited initial use of nuclear weapons in order to bolster the credibility of deterrence. The SPA "Law on Consolidating Position of Nuclear Weapons State" expands the role of nuclear weapons beyond deterring high-end attacks to also deter and repel lower levels of aggression using its nuclear weapons: "The DPRK shall take practical steps to bolster up the nuclear deterrence and nuclear retaliatory strike power both in quality and quantity to cope with the gravity of the escalating danger of hostile forces' aggression and attack."

Logically, it may make some sense for Pyongyang to move beyond a reliance on assured retaliation to a war-fighting posture that threatens the early use of nuclear weapons to also deter conventional attacks. Just like NATO was confronted by the Soviet Union during the Cold War and Pakistan faces a superior India today, Pyongyang is confronted by more capable American and South Korean conventional forces.

However, if the North evolves in this direction, it will have to address a number of difficult issues, particularly the reality that such a strategy would require integration of nuclear weapons into its broader military doctrine and a much more sophisticated command and control system including some pre-delegated authority to commanders to use those weapons. On the first count, there are some signs that Pyongyang is considering such integration. But on the second, at least as of today, launch authority remains highly centralized as might be expected in a regime like

North Korea. Whether this will change in the future remains unclear. While change would appear unlikely, making predictions is difficult, in part because Kim Jong Un's leadership style is still evolving.

Aside from technological challenges, an additional factor to consider in predicting the future of Pyongyang's nuclear strategy could be unique national circumstances. North Koreans often argue that military hardware has to be adapted to Korean circumstances and realities, an argument that may also apply to nuclear weapons and seems particularly relevant given Kim Il Sung's past skepticism about the use of these weapons. To the extent Pyongyang's war plans are based on the expectation of actually winning and inheriting South Korea's wealth, avoiding widespread or indiscriminate and unnecessary damage would seem to be very important, once again driving the North in this direction. However, even in the context of building a force of more accurate, lower yield nuclear weapons, there may be a significant political/psychological barrier to their use by North Korean leaders on the peninsula, namely, they would be used against their own people.

In this context, Pyongyang would probably have no such hesitation in using nuclear weapons against Japan in a war on the peninsula. It would not be hard to imagine that if the tide turned against the North, in part because of Japan's role in assisting the US and South Korea, that Pyongyang could use these weapons against civilian and military targets in that country.

Given the development of North Korea's deterrence strategy over time, its most recent manifestations and the possible technical, political and other challenges facing Pyongyang in formulating a future approach, how might North Korea's nuclear strategy evolve under the three scenarios postulated out in this paper?

- **Low-end Scenario:** A North Korea armed with 20 nuclear weapons and only minor improvements to its current force of delivery systems seems likely to continue to rely on a policy of assured retaliation, threatening the use of these weapons in response to a nuclear attack by the United States. In that context, if necessary, their use against targets in South Korea will be allowed only under extreme conditions. The threshold for use against targets in Japan will be lower.
- **Medium Scenario:** With a nuclear deterrent of 50 nuclear weapons, a growing range of yield, additional mobile theater-range delivery systems possibly including greater numbers based at sea, and an emerging intercontinental force, Pyongyang will possess a more survivable and robust assured retaliatory capability perhaps able to credibly threaten the United States. Pyongyang's greater assured retaliatory capability may allow the development of more limited options for the use of these weapons against theater targets, particularly in Japan. Still, the limitations against using these weapons on the peninsula will remain significant.
- **High-end Scenario:** A North Korea armed with 100 low, medium and high-yield nuclear weapons that can be mounted on an array of battlefield, theater and intercontinental delivery systems would certainly have an even more survivable robust assured retaliatory capability. In addition, because of the size of the force as well as its variety of delivery systems and nuclear devices, the North could consider a further evolution in its nuclear strategy beyond assured retaliation to allow for threatening "first use," but only under

certain conditions. In that context, “battlefield” nuclear weapons would be integrated into Pyongyang’s war plans and the limited use of these weapons on the peninsula would be provided for under certain conditions. The threshold for use against Japan would be lowered as well.

Is North Korea’s Nuclear Future a Game Changer?

While the North Korea’s Nuclear Futures Project plans to address the implications of and policy responses to these developments in detail in the future, the results of this workshop raises disturbing questions:

- On the US geopolitical position in Asia, will an increasing North Korean WMD challenge result in a decreasing ability by the United States to successfully rebalance and manage its alliances?
- On the military strategy to defend the Republic of Korea, as DPRK force survivability and its options for the possible use of nuclear weapons increase, will our ability to prevent the North from crossing the nuclear threshold in a conflict decrease?
- On non-proliferation, as the North Korean arsenal grows and the danger of nuclear/missile exports increases, will our ability to prevent this from happening or to punish Pyongyang decrease?
- Finally, on North Korean foreign policy, as its WMD capabilities grow, will Pyongyang’s external behavior become more assertive while our ability to counter that behavior decreases?

One final critical issue that these developments raise is the answer to the question “who is winning the battle of alternative paths between the United States and North Korea?”

For two decades, American presidents have presented a choice to North Korea between giving up its nuclear weapons program and establishing better ties with the international community, leading to economic prosperity, or isolation and self-implosion.

Today, Kim Jong Un is increasingly offering his own choice between accommodation and acceptance of a nuclear-armed North Korea or periodic tensions and instability on the peninsula. This offer is built on the foundation of a nuclear and missile capability that is poised to rapidly expand over the next five years.

The answer to this question remains entirely unclear but will determine the future shape of Northeast Asia for many years to come.

TECHNOLOGY AND STRATEGY

Introduction

Since the end of the Korean War, the United States has grappled with the security challenge posed by the Democratic People's Republic of Korea. An increasingly important component of that challenge has been North Korea's pursuit of nuclear weapons and delivery systems. Pyongyang's quest has stretched out over decades, representing an enormous investment of manpower, resources and money totaling billions of dollars.

While the international community is generally aware of Pyongyang's programs, largely through the North's sporadic conduct of nuclear weapons and long-range rocket tests, little recent attention has been focused on the very significant dangers posed by this effort. The international community and media are focused on heading off Iran's small nuclear weapons program rather than on the disturbing developments on the Korean peninsula. Another reason for the lack of serious attention is the still prevailing view of North Korea as a starving, backwards and isolated country led by a young inexperienced and somewhat comical dictator. That perception was, to some degree, offset by the recent North Korean cyber-attack on Sony Pictures.

The North Korea's Nuclear Futures Project,¹ conducted by the US-Korea Institute at the Johns Hopkins School of Advanced International Studies in cooperation with the National Defense University Center for the Study of Weapons of Mass Destruction, was established in mid-2014 to examine Pyongyang's emergence as a small nuclear power. The project, through a series of three workshops in 2014-2015, will analyze how North Korea's nuclear deterrent and strategy may develop over the next five years, the implications for the United States, the region and the international community and possible policy responses.

The first of three workshops, held in October 2014 was attended by a distinguished group of American experts on weapons technology, North Korea, US nuclear weapons and strategy as well as on the experiences of other small nuclear powers such as Israel, Pakistan, India and

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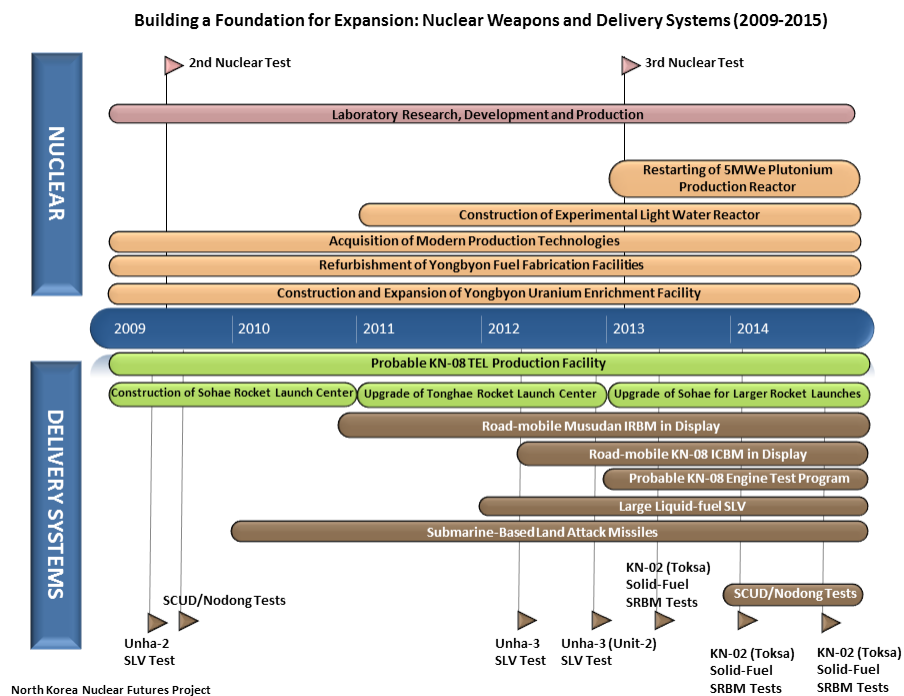
China. The meeting analyzed North Korea's WMD technology and its emerging nuclear strategy, looking at where it might be headed by 2020. Given the uncertainties involved in forecasting the future, the workshop developed a range of possible scenarios over the next five years.²

North Korea's WMD Programs: Poised for Expansion

Building on a decades-long effort and recent large-scale investments since the collapse of the 1994 US-North Korea Agreed Framework in 2002, Pyongyang's nuclear and missile programs have gathered significant momentum. While predicting North Korea's future course of action is always difficult, these programs now appear poised to rapidly expand over the next five years, presenting a serious challenge to the United States, Northeast Asia and the international community.

That expansion will benefit from a long list of accomplishments achieved between 2009 and 2015, banner years for Pyongyang's nuclear and missile programs (figure 1). Aside from the most obvious manifestations of this effort—North Korea's second and third nuclear detonations in 2009 and 2013 and two long-range rocket tests in 2012—Pyongyang has been conducting other important activities on both fronts. Building on its two nuclear tests, the North has probably made further advances in the development of nuclear weapons. At the same time, Pyongyang has modernized and expanded its fissile material production infrastructure and continued a concerted effort to procure technology abroad, particularly for its uranium enrichment program.

Figure 1. Building a Foundation for Expansion: Nuclear Weapons and Delivery Systems (2009-2015).



² This summary is based on workshop papers authored by David Albright, John Schilling, Joseph Bermudez and Shane Smith that formed the basis for discussion and comment by other experts at the meeting. The project would also like to thank Olli Heinonen, Michael Elleman and Robert Carlin for their contributions to its work.

Significant advances were also made in the development of missile delivery systems, including: 1) the appearance of two new road-mobile rockets; 2) a large number of missile tests including three launches of space launch vehicles as well as existing medium-range missiles, and an extended-range solid-fuel short-range ballistic missile; 3) the possible development of new sea-based land-attack missiles—cruise or ballistic—as well as what may be a class of submarine designed to handle such systems; 4) the development of a rocket significantly larger than the Unha space launch vehicle (SLV) that may have military applications; and 5) the modernization of Pyongyang's development, testing and production infrastructure.

These activities could just be the tip of the iceberg. Public information on North Korea's nuclear and missile activities is less than is available to the US and other governments. That information, in turn, probably does not provide a full picture either, since Pyongyang tries to cloak its effort in secrecy. The scope of activity, however, is no guarantee that these programs will result in the deployment of more and newer weapons. Indeed, the history of these kinds of programs in other countries is one of periodic failures due to a host of problems—political, technical, economic and bureaucratic. Nevertheless, North Korea's activities are disturbing indicators of a vibrant and extensive effort to build a larger nuclear arsenal and more capable missile delivery systems.

Impending Rapid Growth of the Nuclear Weapons Stockpile

North Korea's current nuclear stockpile is estimated at 10-16 weapons including 6-8 devices fashioned from plutonium and 4-8 from weapons-grade uranium. This range reflects uncertainty, at least in terms of publicly available information, in the number of plants producing weapons-grade uranium, of centrifuges deployed successfully and how well these centrifuges have operated.³

As for the nuclear designs themselves, North Korea has likely achieved a level of sophistication sufficient to allow Pyongyang to mount warheads on its main regional delivery system, the Nodong MRBM, which is able to reach targets in South Korea and Japan. The North's effort to develop such a warhead began in the mid-1980s and has stretched on for almost 30 years. Pyongyang may have also received other helpful nuclear designs from the smuggling network run by A.Q. Khan in the 1990s or earlier from China, as Pakistan did in the early 1980s. Moreover, given the likely dimensions of the North Korean warhead, it can probably also be mounted on other missiles, particularly a Taepodong ICBM, a militarized version of the North's Unha space launch vehicle.

³ In the first scenario, North Korea operates two production-scale plants, the first starting production sometime between 2005 and 2010. The first plant is assumed to have produced weapons-grade uranium and to contain 2,000-3,000 P2-type centrifuges. The second plant at Yongbyon is assumed to contain at least 2,000 P2-type centrifuges and have made only low-enriched uranium (LEU) for reactor fuel through 2014, perhaps to avoid detection by international inspectors in case of a negotiated shutdown. In this scenario, 15-16 weapons are produced by the end of 2014. In scenario two, North Korea has only one production-scale plant that started operating in 2010. Through 2011, the plant produced LEU for the North's light water reactor and for the next three years, weapons-grade uranium. This scenario corresponds to North Korean public statements about its centrifuge program. The plant is assumed to have started operations with 2,000 P2-type centrifuges with additional machines becoming operational by the end of 2014, possibly as a result of the recent expansion of the Yongbyon plant. In this scenario, 10-11 weapons were produced by the end 2014.

As for warheads based on weapons-grade uranium, that effort may lag slightly behind the development of plutonium-based designs. Such weapons would require larger amounts of fissile material and have a larger diameter. While it is not likely that a North Korean fission device using WGU could be mounted on a Nodong missile today, Pyongyang will probably develop such a warhead in the near-future based on existing knowledge. It will not require further nuclear tests to accomplish this objective.

Building on activities conducted over the past five years, North Korea's nuclear weapons stockpile appears ready to grow rapidly and to achieve important qualitative improvements by 2020.⁴ How rapidly its arsenal expands and what level of improvements Pyongyang achieves will depend on three critical factors: 1) the level of political and economic commitment by the North Korean leadership; 2) Pyongyang's ability to achieve further technological advances largely, but not entirely dependent, on the conduct of nuclear tests; and 3) the success of the North's efforts to secure foreign assistance—the illicit procurement of technology, the level of nuclear cooperation with other countries such as Iran and the acquisition abroad of nuclear weapons data and new designs.

Three scenarios have been formulated to project the size and sophistication of North Korea's nuclear stockpile taking into account these factors. While these scenarios are by no means all the possible paths of development for North Korea's nuclear weapons program, by laying out what may be the best and worst case analyses, they capture a band that has a greater chance of predicting the future than focusing on any one probable outcome. Moreover, the scenarios also provide a roadmap for what qualitative improvements might be possible under different circumstances.

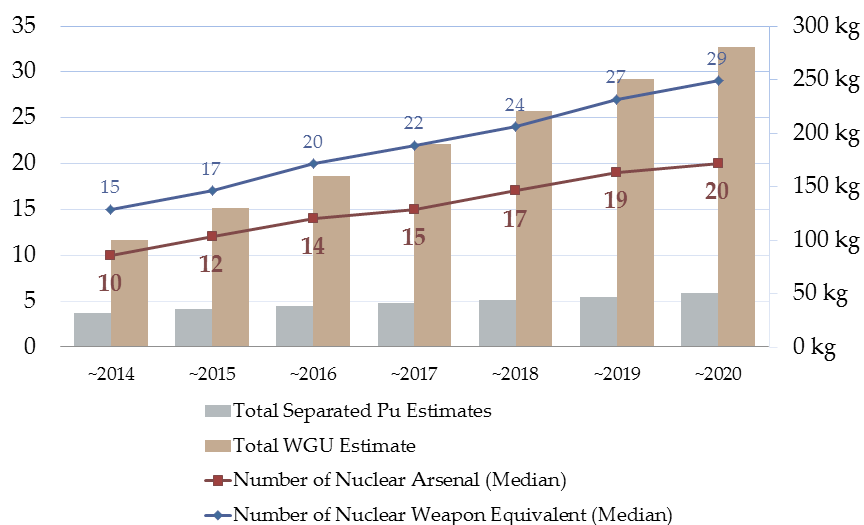
Scenario 1: Minimal Growth, Minimal Improvement

Under this scenario, North Korea's nuclear arsenal grows slowly and technological improvements are minimal. The stockpile increases 100 percent from a low current level of 10 weapons to 20 weapons by 2020 (figure 2). The yields of these weapons remain essentially the same—10 kilotons—as in the baseline stockpile. Further miniaturization is minimal, largely through honing existing nuclear weapons design skills, without sacrificing yields. The number of designs remains small, suitable only for a few delivery systems, mainly the Nodong MRBM and a Taepodong-2 ICBM. No reductions are achieved in the amount of fissile material necessary for each weapon. Improvements in safety, security and reliability will also be minimal.

⁴ Overall DPRK objectives appear to include: 1) increase the size of its stockpile; 2) increase the explosive yield of weapons, including developing advanced weapons designs; 3) additional miniaturization without sacrificing yield; 4) reduce the amount of nuclear material in each weapon; 5) increase safety, security and reliability; and 6) greater self-sufficiency in the production of weapons.

Figure 2. Illustrative Low-end Threat, 2020 Nuclear Arsenal.

Illustrative Low-end Threat 2020 Nuclear Arsenal: 100% Increase



This scenario assumes: 1) a low level of fissile material production based on a restarted 5 megawatt-electric (5 MWe) plutonium production reactor at Yongbyon experiencing periodic operating difficulties as well as one plant producing weapons-grade uranium with only 3,000-4,000 operating centrifuges; 2) no further nuclear tests, possibly because of pressure from China; 3) difficulties in acquiring foreign technology—such as vacuum equipment, pumps, sophisticated computer numerical controlled (CNC) machine tools and specialized chemicals and metals—that further reduce the efficiency of fissile material production; and 4) nuclear weapons related information acquired abroad is minimal and cooperation with other countries—including Iran—achieves few results.

The slow growth scenario may be the result of a number of underlying factors. For example, the level of political and economic commitment to the program by North Korea's leadership could diminish either because of a decision that 20 weapons is a sufficient number to defend the country or because of deepening problems in the civilian economic sphere that limit resources available for these programs.

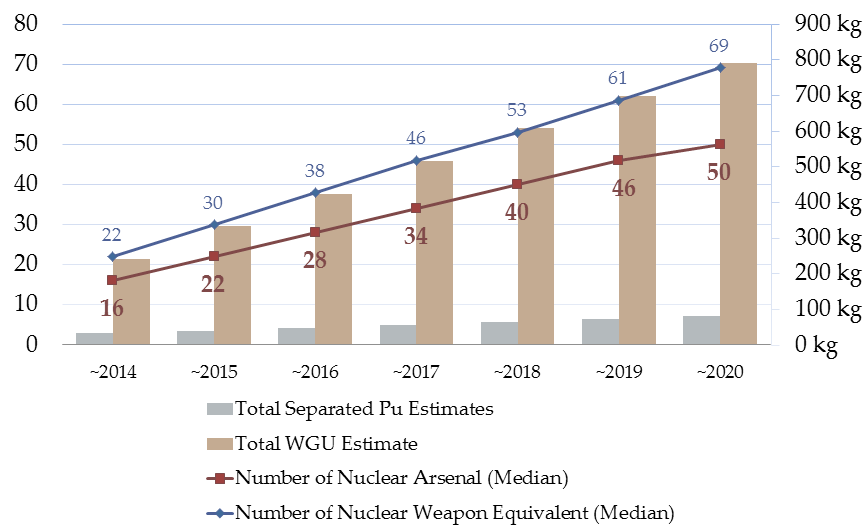
Scenario 2: Moderate Growth, Moderate Improvement

Continuing the current trajectory, North Korea's stockpile grows from 16 weapons to 50, an increase of 212.5 percent (figure 3). Modest qualitative improvements are achieved. Advances in miniaturization enable the North to mount warheads on a new generation of road-mobile IRBMs and ICBMs as well as short-range ballistic missiles. Continued nuclear testing and advances in design skills enable the North to increase the yields of existing designs to 10-20 kilotons on average. Moreover, Pyongyang develops and deploys a weapons design that contains plutonium

and weapons-grade uranium in the same core, allowing a significant increase in explosive yield up to 50 kilotons. In addition, the North may develop an even more advanced single stage thermonuclear design—not fully tested or deployed—that utilizes tritium, deuterium and lithium within a composite core of plutonium and WGU.

Figure 3. Illustrative Medium Threat, 2020 Nuclear Arsenal.

Illustrative Medium Threat 2020 Nuclear Arsenal: 212.5% Increase



In this scenario, North Korea's fissile material production base is larger, consisting of the 5 MWe reactor operating more efficiently and partial use of an operating small light water reactor for producing plutonium as well as 6,000-7,000 operating centrifuges in two plants producing WGU. The centrifuges operate at poor efficiency but better than in the low-end projection. Moreover, Pyongyang develops a centrifuge similar to the Pakistani P3-type that can double the output of its existing model when eventually deployed. A final assumption is that the North conducts a nuclear test every 3-4 years, just as it has since 2006, as part of an active development program.

The North Korean leadership stays the course in its political and economic commitment to the development of a nuclear deterrent. Mixed success is achieved in securing foreign technology (but better than in the low-end scenario) resulting in progress in making key materials and equipment domestically. Some benefits may also come from limited nuclear cooperation with Iran that will aid Pyongyang's centrifuge program and procurement efforts.

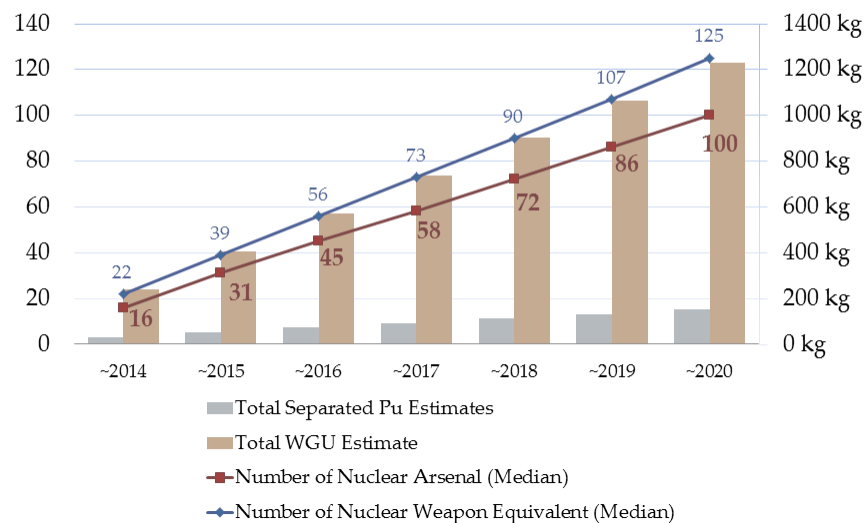
Scenario 3: Rapid Growth, Rapid Improvement

North Korea's nuclear stockpile grows more rapidly than in the two previous scenarios, to 100 weapons by 2020, an increase of 525 percent (figure 4). Significant advances are made in nuclear weapons design. Further miniaturization allows the DPRK to deploy battlefield and

small tactical nuclear weapons if it should chose to do so. The average yield of weapons in the North's stockpile with either uranium or plutonium cores increases to 20 or more kilotons while an increasing number of composite core devices with yields of 50 kilotons are deployed. A one-stage 100 kiloton thermonuclear device is tested but is too large to become operational. Work is conducted on designing and developing a two-stage thermonuclear device.

Figure 4. Illustrative High-end Threat, 2020 Nuclear Arsenal.

Illustrative High-end Threat 2020 Nuclear Arsenal: 525% Increase



The rapid growth and qualitative improvement of the nuclear stockpile in this scenario is the result of: 1) a plutonium production base consisting of the 5 MWe reactor consistently operating at full power and a fully militarized small light water reactor available as of 2016, two years earlier than in the previous projection; 2) two operating uranium enrichment plants with greater numbers of centrifuges—8,000-9,000—including 2,000 of the more modern P3-type design; 3) an increased nuclear test rate of one detonation per year; 4) successful overseas procurement facilitating greater indigenous production of key equipment and materials facilitating even further development of indigenous capabilities; and 5) the acquisition of nuclear weapons data and an advanced design abroad allowing the North to speed up weapons development.

This scenario assumes that the North Korean leadership steps up its political and economic commitment to its nuclear program, perhaps as a result of an increasingly threatening external security environment. A commitment of more resources to the program may also be the result of an improving civilian economy or even cutbacks in conventional military expenditures.

One Last Scenario: Rapid Growth without Testing

One last scenario is worth nothing, namely that North Korea could end nuclear testing but continue and perhaps accelerate its production of fissile material. Under this scenario, Pyongyang's nuclear weapons stockpile could continue to grow to as many as 100 weapons with very limited qualitative improvements. Moreover, despite its technological limits, given the assessment of Pyongyang's current level of miniaturization, such a stockpile would be able to arm a large number of selected delivery systems in the North's inventory, particularly the Nodong MRBM able to reach South Korea and Japan.

New Delivery Systems Possible if Significant Challenges are Solved

While North Korea's nuclear delivery systems are capable and able to reach most potential targets in the region, activities over the past five years indicate that Pyongyang has bigger ambitions and is seriously pursuing the deployment of more capable weapons. However, the future of these systems remains more uncertain than in the nuclear program, particularly in view of important engineering and other challenges facing Pyongyang.

North Korea's current force, consisting largely of an array of 1,000 ballistic missiles based on decades-old Soviet technology, remains limited but capable. The backbone of that force, the Nodong MRBM, is mobile, survivable, reliable and accurate enough to strike cities, ports and military bases. Supplementing the Nodong is a large stockpile of SCUD missiles able to carry a nuclear payload 300-600 kilometers as well as a newer mobile SRBM, the KN-02 Toksa, notable because its solid fuel allows the system to be more survivable and responsive. Overall, Pyongyang's current inventory appears more than large enough to accommodate even the rapid expansion of the North's nuclear stockpile to a level of 100 weapons.

In addition, North Korea may also be able to deploy a limited number of Taepodong-2 ICBMs, essentially a militarized version of the Unha SLV in an "emergency operational capability," intended to at least threaten the possibility of striking targets in the United States. The Taepodong, however, would suffer from potential problems not unlike early US and Soviet ICBMs deployed in the 1950s including: 1) low reliability given the limited number of flight tests and high percentage of failures (three out of four launches) of its SLV counterpart; 2) vulnerability to preemptive attack since the missile would probably be deployed on an above ground launch pad; and 3) the lack of testing of reentry vehicles necessary for long-range missiles carrying nuclear weapons, although it is worth noting that early US missiles were deployed with inaccurate but functioning "blunt body reentry vehicles" that did not require flight testing.

Four activities from 2009 until 2014 provide important clues as to the North's future objectives:

1. The appearance of more modern road-mobile ballistic missiles with greater ranges—the Musudan IRBM and KN-08 ICBM—signal an intention to withstand preemption, to provide the leadership with more significant retaliatory response options and to strike American bases on Guam and targets in the continental United States.

2. What appears to be an effort to develop sea-launch, land-attack missiles—cruise or ballistic—on surface ships or submarines that would increase survivability and expand the threat to theater targets, particularly Guam, as well as complicate missile defense planning since mobile platforms can strike from any direction.
3. Pyongyang's plan to build a larger SLV could contribute to further development of long-range missiles through the testing of common technologies such as high-energy rocket engines, guidance system components and even reentry vehicles (in sub-orbital modes).
4. The North's program to extend the range of the solid-fuel KN-02 Toksa SRBM may signal an intention to further develop this technology for future use since it has greater stability over long periods of storage. As a result, solid-fueled rockets are more easily transportable and have greater survivability since they can be launched more quickly than liquid-fueled rockets.

The challenges North Korea faces in moving forward with these programs and in accomplishing its objectives are likely to prove difficult but not impossible to surmount. These programs may be subject to unforeseen internal political, economic or other hurdles that could result in either slowing development or even cancelation. That has certainly happened in other countries embarking on the development of similar technologically challenging missile systems.⁵

Progress will also require overcoming technological and engineering hurdles that are even more significant than in the production of nuclear weapons. In this context, since the North is not self-sufficient in missile production, the level of foreign assistance—both technology and experienced engineers—could be a critical factor determining how much progress Pyongyang is able to make in the future in critical technologies such as high-performance liquid-fuel engines, solid-fuel rocket motors, high-speed heat shields and reentry vehicles, guidance electronics, sophisticated machine tools and high-strength, lightweight materials.

Nevertheless, North Korea may have a far less demanding definition of “success” in the development of new missiles than the United States, whose delivery systems are extensively tested before becoming operational to ensure a high degree of reliability and predictability. Other small emerging nuclear powers have had the same view of new missile delivery systems, deploying systems with very few flight tests. This practice highlights another important consideration for Pyongyang (and these other countries), namely that deployments of new delivery systems, even if not fully tested, can have an important political purpose in sending deterrence signals to potential adversaries.

Bounding the Problem: Three Deployment Scenarios for 2020

In view of uncertainties in predicting the future, postulating three scenarios that take into consideration the baseline force, technical objectives and critical determining factors will at least provide an illustrative band of possibilities within which a future North Korean delivery force is more likely to fall. It also highlights the steps that may be necessary to field new weapons.

⁵ For example, Iran's program to build a 2,000 kilometer-range solid-fuel missile seemed to be on track for deployment in 2012 but appears to have stalled for reasons other than meeting technical challenges.

Moreover, on the assumption that the DPRK's program will bear some relationship to plans for its nuclear stockpile, combining projections also bounds what the North's overall future force posture may look like in 2020:

1. ***Minimal Modernization:*** North Korean delivery systems remain essentially the same as today, posing a political threat to the United States but focused largely on targets in neighboring countries. This lack of progress reflects: 1) a limited test program (no tests of long-range rockets and only of existing medium or shorter-range systems); 2) significant constraints on the acquisition of foreign technology and assistance, including from Iran; and 3) a high level of political commitment but technical challenges still cannot be overcome or, alternatively, commitment may decrease if the North decides its current force is sufficient and the cost of improvement is too great.

There are two possible new developments in this scenario. First, North Korea could deploy short-range sea-launched ballistic and cruise missiles. This threat could include merchant ships carrying either type of weapon or the first operational submarine-launched cruise missile.⁶ Given the technological challenges in developing such a capability, these weapons would be based on existing North Korean systems, for example, the 160-kilometer KN-01 naval cruise missile or the KN-02 SRBM. A second new development might be deployments of the road-mobile Musudan IRBM in an "emergency operational status" by 2020 despite the lack of full-scale flight tests. The North has already conducted extensive development activities for this missile that might enable such a deployment over the next five years if not sooner. Indeed, as tensions mounted on the Korean peninsula in early 2013, the media reported that the Musudan had been spotted in the field, perhaps in preparation for a flight test. While a test never took place, if the reports were accurate, the deployment may have been intended to demonstrate North Korea's resolve.

2. ***Steady Modernization:*** In this scenario, North Korea continues down its current development path including a test program of 2-3 long-range rocket launches every three years as well as tests of theater systems including the Musudan IRBM. Pyongyang is moderately successful in acquiring foreign technology and assistance despite export controls and sanctions while cooperation with Iran starts to yield benefits in developing solid-fuel technology. A high level of political and economic commitment to these programs by the leadership continues.

As a result, the theater-level threat becomes even greater than in the first scenario and an operational intercontinental threat begins to emerge. In the theater, in addition to possibly deploying more land-attack cruise missiles on submarines and surface ships as well as ballistic missiles on surface vessels, Pyongyang may develop an emergency operational capability to launch short-range ballistic missiles from submarines. On land, the Musudan IRBM becomes operational after flight testing. On the intercontinental level, Pyongyang

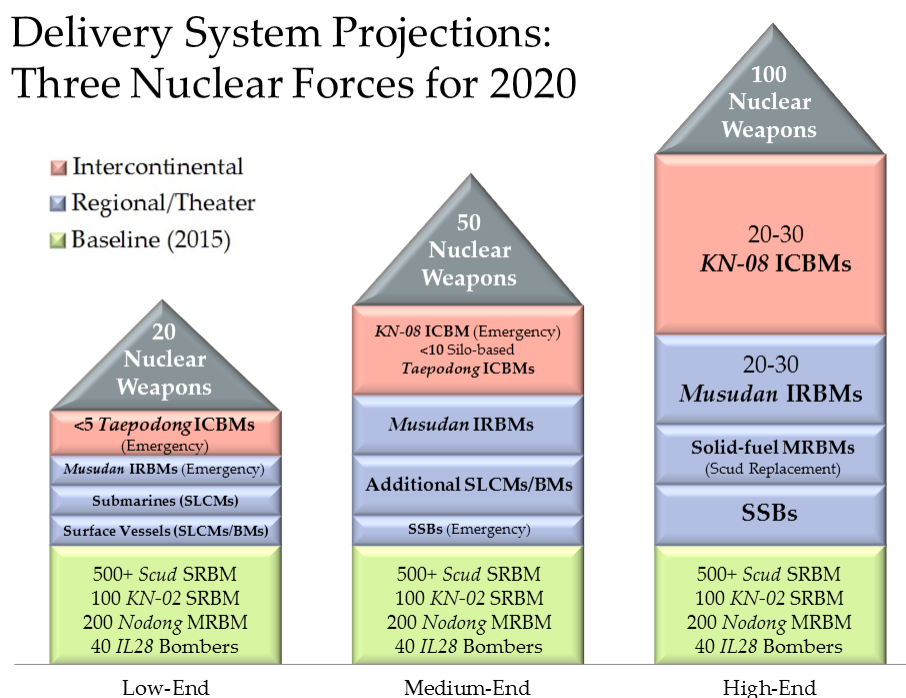
⁶ The United States and the Soviet Union explored the possibility of basing on merchant ships during the early years of the Cold War. Iran has demonstrated this capability and North Korea is believed to have studied this option in the past. Recent commercial satellite imagery, ROK government statements and press reports seem to confirm an active effort by the North in this area, although that is certainly no guarantee that their program will produce operational results.

might consider limited permanent deployments of the Taepodong in hardened silos.⁷ Finally, an accelerated effort to field the KN-08, including flight-testing, may allow the North to field that system for in an emergency operational status intended mainly for political demonstrations.

3. **Maximum Modernization:** North Korea accelerates the deployment of theater and intercontinental delivery systems and begins to explore fielding even more advanced weapons. Pyongyang pursues an aggressive flight-test program with 3-4 launches per year of long-range rockets. Reinforcing these stepped up development programs, the North is successful in securing hardware and assistance overseas as well as important assistance from governments such as Iran. It may also secure the help of foreign experts. Finally, the level of political and economic commitment to these programs increases, perhaps because of an increased security requirement or successful civilian economic development frees resources that can be channeled into these programs.

As a result, a growing theater and intercontinental threat emerges more rapidly. In the theater, this may mean greater numbers of the Musudan IRBM are deployed, a more survivable, accurate solid-fuel 300-kilometer range missile is developed to replace the SCUD and possibly the DPRK's first operational ballistic missile submarine is fielded.⁸ On the intercontinental level, the DPRK would begin to deploy growing numbers of the road-mobile KN-08 ICBM.

Figure 5. Delivery System Projections: Three Nuclear Forces for 2020.



⁷ Aside from extensive experience in building silos for surface-to-air missiles dating back to the 1970s, Pyongyang has also explored basing ballistic missiles in silos since at least the early 1990s. Moreover, North Korean scientific literature demonstrates an understanding of the technical challenges involved in building such silos.

⁸ Such a development would probably require foreign assistance from countries or individuals with experience in building ballistic missile submarines.

An Evolving Nuclear Strategy

Pyongyang's nuclear strategy—its plans for how to use these weapons in wartime and to communicate those plans in peacetime to deter potential opponents—is also a work in progress. Therefore, predicting Pyongyang's strategy in 2020 is difficult given a number of uncertainties, not the least of which is the level of development its nuclear and missile capabilities will reach in the next five years. Nevertheless, an examination of the evolution of North Korean thinking about nuclear weapons, of its defense strategy over the past five decades and specific investments made in its nuclear and missile programs can provide important clues as to the future.

The development of a nuclear strategy in North Korea reflects five overriding principles: 1) the maintenance of the Kim family leadership; 2) deterrence of the United States and South Korea; 3) elimination of all internal threats; 4) economic development of the nation; and 5) reunification of the Korean peninsula.

In that context, as North Korea's nuclear program has evolved, the country's leadership and the Korean People's Army gradually developed a strategy that appears to have progressed in stages, from viewing these weapons as primarily political tools to deter attack, to a strategy focused on defense intended to inflict unacceptable losses upon attacking forces, to an approach that possibly views nuclear weapons in the context of a range of strategic, operational and "battlefield" (i.e. tactical) wartime uses. Specifically, Pyongyang's views on nuclear weapons can be divided into five historical periods:

1. ***Fatherland Liberation War and Reconstruction (1950-1960):*** Recognition of the potential destructiveness of nuclear weapons and the almost total lack of defense against them was significantly reinforced when the US threatened to employ these weapons to end the war. These threats had a profound effect on the North Korean leadership and have pervaded its thought and actions ever since. Pyongyang established a strategy to address what was then called "ABC" (Atomic, Biological and Chemical) weapons by starting its own nuclear research programs—necessary to build the skills for eventually developing its own weapons—and reestablishing chemical defense units also responsible for preparations against nuclear attack.
2. ***Substituting Chemical Weapons for a Nuclear Deterrent (1960-1976):*** During this period, the institutionalization of limited but practical defensive nuclear warfare capabilities in response to continued concerns about the US nuclear weapons threat was achieved. It appears that Kim Il Sung and the North Korean leadership believed that Pyongyang's acquisition of chemical weapons as substitutes for nuclear weapons in combination with the KPA's growing conventional forces, could deter US nuclear weapons use. Moreover, Pyongyang established a program for the construction of underground facilities and emphasized operations on the chemical and nuclear battlefield in training.
3. ***Nuclear Weapons as Political/Diplomatic Symbols (1976-1989):*** As Pyongyang's nuclear development program advanced and missile and aircraft delivery systems were acquired, the KPA initiated a systematic study of US, Soviet and Chinese nuclear warfare concepts and strategies. By 1989, a rudimentary deterrence strategy had been developed

focused on the political and diplomatic utility of nuclear weapons rather than as tools to fight a war. The view appears to be supported by Kim Il Sung's reported pronouncement during this period that nuclear weapons could not be used on the Korean peninsula due to its small size. In the minds of the North Korean leadership, the correctness of pursuing nuclear weapons as tools to enable room for political maneuvering was likely reinforced by the international political pressure brought to bear to compel them to sign the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1985. Until the time when nuclear weapons would become available, it appears that the North Korean leadership viewed chemical weapons and expanding conventional armed forces, combined with emerging asymmetric capabilities, as the primary means of deterring the threat of US nuclear weapons.

4. ***Strategy Refined (1989-early 2000s):*** This period was the most tumultuous in the existence of North Korea since the Korean War, including the collapse of its Soviet ally, China's rapprochement with South Korea, the rapid US victory over Iraq in Operations Desert Storm/Desert Shield, the death of Kim Il Sung and a deteriorating economy as well as widespread famine. Under these circumstances, the North sought to capitalize on the political and diplomatic utility of nuclear weapons by accepting significant limits on its fissile material production program in return for better relations with the United States. Nuclear research and development programs continued as did the development of ballistic missiles, although longer-range weapons were subject to an agreed test moratorium with the United States.

By the late-1990s, however, Pyongyang probably realized that Iraq's chemical weapons did not hinder the US from soundly defeating that nation and that those weapons would not deter US nuclear use on the peninsula. Moreover, the North seems to have jump-started a uranium enrichment program that could eventually produce weapons-grade material. The adoption of a deterrence strategy, based on the KPA's study of other country's nuclear strategies as well as the Iraq experience, emerged in the early 2000s, after the collapse of the 1994 Agreed Framework when the North may have achieved an emergency nuclear capability based on a handful of weapons and ballistic missile delivery systems. Evolving views of nuclear warfare and strategy were reflected in North Korean rhetoric about the use of overwhelming artillery, conventional ground forces and ballistic missiles as well as Pyongyang's "right" to possess nuclear weapons as a deterrent to the US nuclear threat.⁹

5. ***Assured Retaliation Emerges (Early 2000s-2014):*** North Korea's development of a nuclear force and strategy to deter the United States and to ensure regime survival continued during the years leading up to King Jong Il's death and afterwards. Two events—Libya relinquishing up its WMD programs under pressure from the United States, followed by the March 2011 US attack on that country and the 2007 Israeli airstrike destroying the North Korean reactor under construction in Syria—reinforced Pyongyang's view that neither event would have occurred had those nations possessed nuclear weapons. Indeed, key nuclear and missile programs accelerated under Kim Jong

⁹ An example of this was a 2002 Foreign Ministry statement declaring that North Korea is "...entitled to have nuclear weapons and more [powerful weapons] than those to safeguard our sovereignty and right to survive in response to the increasing US threat of crushing us with nuclear [weapons]."

It and became more visible at the end of his life. Since his death, Pyongyang under Kim Jong Un's leadership has also taken political steps to emphasize the importance of nuclear weapons, including enshrining their possession in its Constitution and emphasizing the simultaneous development of nuclear weapons and the North's economy.

Important developments point to the further elaboration of the requirements for deterrence to buttress assured retaliation and perhaps some initial thinking on the use of nuclear weapons in a wider range of contingencies:

- The reorganization of the Ballistic Missile Training Guidance Bureau into the Strategic Forces Command that appears to have the same status as the ground forces, Navy and Air and Anti-Air Commands elevated the significance of the North's deterrent in its defense strategy.
- The continued acquisition of weapons necessary to further develop a survival nuclear force better able to fulfill the deterrence mission including longer-range mobile weapons—the Musudan IRBM and KN-08 ICBM—and possibly sea-based cruise and ballistic missiles.
- Pyongyang has made significant progress in the production of fissile material and is striving to develop more advanced, miniaturized weapons that can be mounted on its delivery systems. (The North has also made numerous public references to the importance of developing miniaturized nuclear warheads for ballistic missiles.)
- North Korea has conducted an increasing number of ballistic missile exercises during the last five years that have increased in size, realism (e.g., shoot-and-scoot), complexity (e.g., volley and time-on-target fire missions) and demonstrated capabilities (e.g., atypical flight trajectories). These capabilities are applicable to the use of both conventional and nuclear weapons in wartime.
- The past five years have also witnessed a new sophistication in the North's articulation of its nuclear weapons strategy—the practical military application of these weapons and their utility in pursuing political priorities—that may be intended for external as well as internal audiences.¹⁰ Much of the rhetoric is very similar to US and Russian terminology, with nuclear weapons usage characterized in battlefield, operational and strategic terms. However, while these statements on the surface suggest an important evolutionary step in the North's thinking about deterrence and strategy, they may also be understood as political rhetoric employed to mimic US statements or as an aspirational objective of KPA planners given the current small size of the North's nuclear stockpile and limited delivery capabilities.

¹⁰ This language and terminology is reflected in the SPA Law as well.

Nuclear Strategy in 2020

All of these developments would seem to indicate that Pyongyang is striving for a policy of deterrence based at the very least on a more credible assured retaliation capability. This approach is reflected in North Korea's policy adopted by the SPA in 2013: "(Nuclear weapons) serve the purpose of deterring and repelling the aggression and attack of the enemy against the DPRK and dealing deadly retaliatory blows at the strongholds of aggression..."

The key question for the future is whether Pyongyang has the ambition to establish deterrence based on a strategy beyond assured retaliation that includes options for the limited initial use of nuclear weapons in order to bolster the credibility of deterrence. The SPA "Law on Consolidating Position of Nuclear Weapons State" appears to at least posit the expansion of the role of nuclear weapons beyond deterring high-end attacks to also deter and repel lower levels of aggression using its nuclear weapons as a future objective. It states: "The DPRK shall take practical steps to bolster up the nuclear deterrence and nuclear retaliatory strike power both in quality and quantity to cope with the gravity of the escalating danger of hostile forces' aggression and attack."

Logically, it may make sense for Pyongyang to move beyond relying on assured retaliation to a posture that threatens the limited early use of nuclear weapons to deter attacks by superior conventional forces. Just like NATO was confronted by the Soviet Union during the Cold War and Pakistan faces a superior India today, Pyongyang is confronted by more capable American and South Korean conventional forces. However, if the North evolves in this direction, it will have to address some difficult issues, particularly the reality that such a strategy will require a much more sophisticated command and control system with some pre-delegated authority to commanders to use those weapons as well as integration of nuclear weapons into its broader military doctrine.

There are some hints that the North may move to address the second problem. The Central Committee of the Workers' Party released a report one day before the SPA Law was issued directing the military to begin such planning: "The People's Army shall perfect the war method and operation in the direction of raising the pivotal role of the nuclear armed forces in all aspects concerning war deterrence and war strategy, and the nuclear armed forces should always round off the combat posture." But on the issue of command and control, launch authority remains highly centralized and the prerogative of the "Supreme Commander of the Korean People's Army" as might be expected in a regime like North Korea. While change in this practice appears unlikely, it is also difficult to predict, in part because Kim Jong Un's leadership style is still evolving.

Aside from technological challenges, an additional factor to consider in predicting the future of Pyongyang's nuclear strategy is unique national circumstances. North Koreans often argue that military hardware has to be adapted to Korean circumstances and realities, an argument that probably also applies to nuclear weapons and seems particularly relevant given Kim Il Sung's past skepticism about the use of these weapons. To the extent Pyongyang's war plans are based on the expectation of actually winning and inheriting South Korea's wealth, avoiding widespread or indiscriminate and unnecessary damage would seem to be very important, once again driving the North in this direction. However, even in the context of building a force of more accurate,

lower yield nuclear weapons, there also may be a significant political/psychological barrier to their use by North Korean leaders on the peninsula, namely they would be used against their own people.

In this context, Pyongyang would probably have no such hesitation in using nuclear weapons against Japan. It would not be hard to imagine that if the tide turned against the North, in part because of Japan's role in assisting the US and South Korea, Pyongyang would not hesitate in using these weapons against civilian and military targets in that country.

Given the development of North Korea's deterrence strategy over time, its most recent manifestations and the possible technical, political and other challenges facing Pyongyang in formulating a future approach, how might North Korea's nuclear strategy evolve under the three scenarios postulated out in this paper?

- ***Low-end Scenario:*** A North Korea armed with 20 nuclear weapons and only minor improvements in its current force of delivery systems seems likely to continue to rely on a policy of assured retaliation, threatening the use of these weapons in response to a nuclear attack by the United States. That threat may be somewhat strengthened by limited deployments of more survivable sea-launched systems and the emergency operational status of the Taepodong ICBM. In that context, if necessary, the use of these weapons against targets in South Korea will be allowed only under extreme conditions. The threshold for use against targets in Japan will be lower.
- ***Medium Scenario:*** With a nuclear deterrent of 50 nuclear weapons, a growing range of yields, additional mobile theater-range delivery systems possibly including greater numbers based at sea, and an emerging intercontinental force, Pyongyang will possess a more survivable and robust assured retaliatory capability able to more credibly threaten the United States. Pyongyang's greater assured retaliatory capability may allow the development of some limited options for the use of these weapons in a conflict against theater targets, particularly in Japan. Still, the limitations on nuclear use on the Korean peninsula will remain significant.
- ***High-end Scenario:*** A North Korea armed with 100 low, medium and high-yield nuclear weapons that can be mounted on an array of battlefield, theater and intercontinental delivery systems would certainly have an even more robust assured retaliatory capability. In addition, because of the size of the force as well as its variety of delivery systems and nuclear devices, the North could consider a further evolution in its nuclear strategy beyond assured retaliation to allow for threatening "first use," but only under certain conditions. In that context, battlefield nuclear weapons would be integrated into Pyongyang's war plans and the limited use of these weapons on the peninsula would be provided for under certain conditions. The threshold for use against Japan would be lowered as well.¹¹

¹¹ Nuclear strategies do not necessarily dictate how these weapons might actually be used during crisis or conflict. "No first use" can quickly become first use and a "first use" strategy could be overridden in favor of restraint.

US·KOREA INSTITUTE AT SAIS

US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

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JOHN SCHILLING
HENRY KAN

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John Schilling is an aerospace engineer with more than twenty years of experience, specializing in rocket and spacecraft propulsion and mission analysis. Dr. Schilling received his Ph.D. in astronautical engineering from the University of Southern California, and spent most of his career as a contractor for the Air Force Research Laboratory's Propulsion Directorate. He currently works for the Aerospace Corporation as a specialist in satellite and launch vehicle propulsion systems.

Henry (Long) Kan is a Research Assistant at the US-Korea Institute at the Johns Hopkins School of Advanced International Studies (SAIS). His work primarily focuses on nuclear security governance, nuclear command and control systems, and Asia-Pacific maritime security. He holds a B.A. in Political Science and Economics from the University of California, Irvine, where he studied East Asian politics and US national security policy.

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EXECUTIVE SUMMARY

New Delivery Systems Possible if Significant Challenges Are Solved

Pyongyang's inventory of delivery systems is a key factor in considering North Korea's nuclear future. While this inventory is currently based on old Soviet technology only able to reliably reach regional targets, North Korea is seriously pursuing the deployment of more capable, longer-range, more survivable weapons. However, the future course of this effort remains uncertain given technical, engineering and other challenges faced by the North.

Reliable Regional Force

North Korea's current delivery systems consist of about 1,000 ballistic missiles and a small number of light bombers able to reach most targets in South Korea and Japan. This force is comparatively more advanced than most countries at a similar early stage in the development of their nuclear arsenals since ballistic missiles have played an important role in Pyongyang's conventional military strategy for many years. As a result, the current force is more than able to accommodate any future growth in the North's nuclear weapons arsenal, including a worst-case projection of 100 nuclear weapons by 2020.¹

The North's regionally-focused delivery systems include: 1) the Nodong medium-range ballistic missile (MRBM), a mobile liquid-fueled missile with a range of 1,200-1,500 km and accurate enough to attack cities, ports and military bases; 2) a large stockpile of Scud ballistic missiles—also mobile and liquid-fueled—that could carry a nuclear payload 300-600 km; 3) the mobile, solid-fuel KN-02 Toksa short-range ballistic missile (SRBM), based on the old Soviet SS-21 SRBM that was able to carry nuclear, chemical and conventional warheads; and 4) up to 60 Il-28 light bombers built on a 1950s Soviet design.

ICBM in an Emergency

Pyongyang may also be able to field a limited number of long-range Taepodong missiles—a militarized version of the Unha space launch vehicle (SLV)—as an “emergency operational capability,” able to reach targets in the United States. However, such a weapon would represent more of a political statement than an operational capability since it would suffer from significant

¹ For projections, see Joel S. Wit and Sun Young Ahn, “North Korea's Nuclear Futures Project: Technology and Strategy,” US-Korea Institute at the Johns Hopkins School of Advanced International Studies, February 26, 2015, <http://38north.org/2015/02/nukefuture022615/>; and David Albright, “Future Directions in the DPRK's Nuclear Weapons Program: Three Scenarios for 2020,” US-Korea Institute at the Johns Hopkins School of Advanced International Studies, February 26, 2015, <http://38north.org/2015/02/dalbright022615/>.

problems including: 1) vulnerability to attack because of likely basing on an above-ground launch pad; 2) low reliability since its SLV counterpart has only been tested four times and only succeeded once; and 3) a limited ability to deploy an advanced reentry vehicle that would carry a nuclear warhead to its target due to lack of testing. (A possible alternative would be a crude, highly inaccurate, blunt body reentry vehicle similar to those mounted on early American intercontinental ballistic missiles.)

Goals for the Future

Pyongyang conducted a number of significant activities from 2009-2014 that are important indicators of the future direction of its missile program. These activities were:

- The development of new road-mobile missiles with greater ranges—the Musudan intermediate-range ballistic missile (IRBM) and KN-08 intercontinental ballistic missile (ICBM)—that signal an intention to withstand preemption, provide more significant retaliatory options and to target American bases in Guam and the continental United States;
- An effort to develop short-range, sea-based, land-attack missiles that increase survivability, expand the threat to theater targets and complicate defense planning since mobile platforms can launch their weapons from any direction;
- The development of a larger space launch vehicle than the existing Unha SLV—along with the upgrading of the Sohae Satellite Launching Station to launch a new system—as part of what may be an effort to deploy longer-range ballistic missiles; and
- The development of solid-fuel rocket technology through enhancing the range of the KN-02 SRBM, which could yield greater mobility and survivability for future longer-range solid-fuel missiles.

Hurdles to Overcome

The challenges Pyongyang faces in developing new delivery systems over the next five years and beyond are likely to be greater than those encountered in its nuclear program, where basic designs and production infrastructure are already largely in place. Indeed, while Pyongyang's current inventory of older liquid-fueled missiles is impressive, the history of its program, when compared to those in countries like Iran and Pakistan, is characterized by a striking lack of progress over the past few decades. While both countries relied on North Korean assistance in the 1990s to develop the mainstay of their arsenals, both have since diversified their programs by pursuing more advanced medium- and intermediate-range solid-fueled missiles. In comparison, North Korea's experience with solid rocket propellants is much more limited. In short, future challenges could result in slower than anticipated progress or even the cancellation of weapons systems under development.

Particularly important will be North Korea's ability to overcome technological and engineering hurdles that even more advanced industrialized countries would find challenging. In this context, since the North is not self-sufficient in missile production, the level of foreign assistance could

be a critical factor determining how much progress Pyongyang is able to make in technologies such as high performance liquid-fuel engines, solid-fuel rocket motors, high-speed heat shields and reentry vehicles, guidance electronics, sophisticated machine tools and high-strength, lightweight materials. Experienced engineers may also help the DPRK surmount technical hurdles. While Pyongyang has been somewhat successful in securing foreign assistance in the past, whether that will continue remains unclear.

Despite these potential hurdles, it is worth noting that North Korea may have a far less demanding definition of “success” in the development of new missiles than countries like the United States, where extensive tests are conducted before weapons become operational to ensure a high degree of reliability. Other small, emerging nuclear powers have had the same view of new missile delivery systems, deploying them with few flight tests or even though they have experienced technical problems. This practice highlights another important consideration for North Korea (and these other countries), namely that deployments of new delivery systems, even if not fully tested, can have an important political purpose in sending deterrence signals to potential adversaries.

Three Scenarios for 2020

As in the nuclear projections for this study, three scenarios for the development and deployment of delivery systems reflecting different political, economic, technological and other assumptions help define future possibilities:

- ***Minimal Modernization:*** North Korea’s development of new delivery systems slows, resulting in a force that remains essentially the same as it is today. Nevertheless, Pyongyang may be able to make some improvements. First, it could deploy short-range, sea-launched cruise and ballistic missiles on surface ships or cruise missiles on submarines based on existing weapons, possibly the KN-01 naval cruise missile or the KN-02 SRBM. Second, Pyongyang could deploy the Musudan IRBM in an emergency operational capability. While the missile has not yet been flight tested, the North has already conducted extensive development activities. Indeed, the Musudan may already have been deployed in an emergency operational status during the 2013 crisis on the Korean peninsula if media reports are accurate.
- ***Steady Modernization:*** North Korea continues its current development and deployment path, resulting in a greater regional threat than in the first scenario and the emergence of a more credible intercontinental threat. In the theater, greater numbers of sea-based systems would be deployed. Pyongyang may also develop an emergency operational capability to field a ballistic missile submarine. On land, the Musudan IRBM becomes an operational system after a limited number of flight tests and an enhanced range KN-02 SRBM is deployed to supplement existing Scud missiles. In addition, Pyongyang may decide to deploy countermeasures to cope with evolving theater missile defenses deployed by the United States, South Korea and Japan, most of which focus on intercepting missiles inside the atmosphere. This will require emplacing rocket-powered darts as decoys on missiles—such as the Nodong—and flight testing to ensure the system works. A more

credible intercontinental threat would consist of the KN-08 ICBM, now available on an emergency basis as it moves towards becoming an operational weapon and possibly Taepodong ICBMs deployed in more survivable hardened missile silos.

- ***Maximum Modernization***: North Korea accelerates the development and deployment of new systems, resulting in a more rapidly emerging regional and intercontinental threat. In the theater, the Musudan IRBM would achieve an earlier initial operating capability and deployments of missiles would increase. A solid-fuel missile with a range of 300 kilometers intended to replace the Scud becomes operational. Pyongyang might also deploy its first operational sea-launched ballistic missile submarine armed with weapons based on the Nodong MRBM or Musudan IRBM. On the intercontinental level, the KN-08 ICBM would reach an initial operational capability with growing numbers deployed by 2020, though numbers would still probably be limited by the availability of critical components, particularly engines. Finally, since the program would achieve considerable momentum beyond 2020, further developments, previously over the time horizon, might include a longer-range ICBM utilizing new high-energy engines that could reach targets anywhere in the United States, more sophisticated guidance systems that would substantially increase accuracy and a solid-propellant replacement for the Nodong MRBM.

A Final Word

The dangers posed by North Korea's continuing effort to develop new nuclear delivery systems are clearly real, although more uncertain than nuclear weapons estimates, given the various technological hurdles Pyongyang will have to overcome in the future. Nevertheless, even if North Korea was severely limited in its ability to further develop a direct threat to the United States beyond probably a handful of ICBMs based on old Soviet technology, its existing inventory of approximately 1,000 missiles has sufficient reliability and range to cover most important targets in Northeast Asia. Moreover, the number of systems likely exceeds even the worst-case estimate for North Korea's nuclear inventory in this study—that the North could field 100 nuclear weapons by 2020. In short, North Korea has already achieved a level of delivery system development that will allow it to establish itself as a small nuclear power in the coming years.

THE FUTURE OF NORTH KOREAN NUCLEAR DELIVERY SYSTEMS

Introduction

Pyongyang's inventory of delivery systems is a key factor in considering North Korea's nuclear future. While its current inventory is well developed, although limited to old Soviet technology only able to reach regional targets, North Korea has bigger ambitions and is seriously pursuing the deployment of more capable, longer-range, more survivable weapons. However, the future of its nuclear delivery systems remains uncertain given technical, engineering and other challenges the North will have to face.

The 2014 Baseline

Pyongyang's current inventory of delivery systems, consisting largely of ballistic missiles with some light bombers, is reliable and nominally able to reach most targets in Northeast Asia. Moreover, it is comparatively more advanced than most countries at a similar early stage in the development of their nuclear arsenals. This is the result of: 1) the North's long-standing requirement to acquire ballistic missiles armed with conventional explosives and chemical warheads as part of its defense strategy; 2) the continued development of these weapons even though the North's plans to deploy large numbers of nuclear weapons were set back by the 1994 US-DPRK Agreed Framework; and 3) the long-standing perceived threat from the United States, a major driving force behind Pyongyang's efforts to build an intercontinental ballistic missile (ICBM) based on a space launch vehicle program in the 1990s.

Intercontinental Ballistic Missile (ICBM) in an Emergency

North Korea may already be able to deploy a Taepodong-2 ICBM—essentially a three-stage military version of the Unha space launch vehicle (SLV) that could carry a 500-1,000 kg warhead 10,000-15,000 km, far enough to reach the US mainland—in an “emergency operational status.”² However, such a weapon would represent more of a political statement than an operational capability since it would suffer from potentially significant problems including:

- Low reliability given the very limited number of tests of its SLV counterpart and the high percentage of failures—three out of four flights;

² If the DPRK fields a Taepodong, the Scud engine used in its second stage might result in unnecessary gravity losses that could rob the missile of as much as 800 km of range. An alternative would be to configure the ICBM with a second stage powered by the Nodong or the R-27 rocket engine likely to be used by the Musudan IRBM. Indeed, the second stage airframe has dimensions that match those of the Soviet R-27 engine.

- Vulnerability to a preemptive strike since it would probably be deployed at an above-ground facility;³ and
- A limited ability to operationally deploy a relatively advanced reentry vehicle due to lack of testing—the weapon would probably have to use a crude and highly-inaccurate blunt body reentry vehicle (RV) similar to those on early American ICBMs (the Thor and Atlas systems) in the 1950s, making it more vulnerable to missile defenses.⁴

Figure 1: Blunt body reentry vehicle on an Atlas missile.



Photo: Air Force Space and Missile Museum.

Reliable Regional Delivery Systems

The overwhelming majority of North Korea's delivery systems are about 1,000 ballistic missiles based on old Soviet technology. The backbone of its current deterrent is the Nodong medium-range ballistic missile (MRBM) with a range of 1,200-1,500 km that can reach any target in

³ Other countries, including the Soviet Union, have deployed their first ICBMs in such a manner probably in large part to send a political message to potential opponents.

⁴ Based on observations of missiles on parade in Pyongyang, the North appears focused on developing a triconic design intended to make the RV more stable during reentry into the Earth's atmosphere. Iran first tested a Shahab-3 with a triconic design in 2004 while North Korea first paraded a Nodong with a similar nose cone in 2010. The timing suggests that Iran may have transferred the design feature to North Korea. However, it is also possible that the design was first suggested by North Korea and then tested and further developed by Iran. It is worth noting that the Nodong with the triconic nose cone paraded by North Korea did not include a number of the new missile design features developed by Iran during the early to mid-2000s. The general shape is also similar to early-generation French warheads found on IRBMs. Moreover, the design allows the same warhead to be interchangeable with the Scud missile. It is also unknown how much development work has already been done using publicly available information and computer simulations.

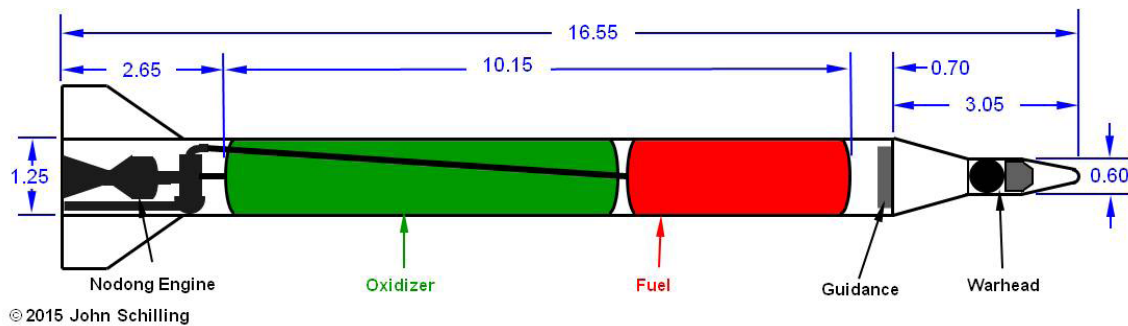
South Korea and most of Japan.⁵ While mobile and probably capable of cross-country travel, the Nodong can also be tucked away in one of the North's many underground tunnels and bunkers. Based on early 1960s Soviet technology, it is an effective, reliable weapon accurate enough to hit within one or two kilometers of targets, enough to destroy cities, ports or military bases.⁶

Figure 2: Nodong with a triconic reentry vehicle.



Photo: AP/Vincent Yu.

Figure 3: Nodong internal configuration.



In addition to the North's large stockpile of old shorter-range Scud missiles able to carry a nuclear payload 300-600 km, Pyongyang has begun to field the newer KN-02 Toksa solid-fuel, road-mobile missile. Derived from a 1980s vintage Soviet weapon and probably available in only limited numbers, the shorter-range Toksa is a more responsive, accurate and mobile

⁵ This range is based on the assumption that the Nodong would carry a 700-750 kg warhead/RV and incorporate improvements as a result of cooperation with Pakistan and Iran. North Korean engineers are believed to have been present during Pakistan and Iranian tests in the late 1990s and early 2000s. Moreover, the Nodong has been spotted in parades with the triconic RV also used by Iran, although later improvements made by Tehran do not seem to have been incorporated into the North Korean design.

⁶ Expert estimates vary on reliability from 75 to 90 percent.

system by virtue of its solid fuel. The older Soviet model was able to carry nuclear, chemical and conventional warheads, but it remains unclear whether the Toksa is intended for the nuclear mission.

Figure 4: The KN-02 Toksa.



Photo: AP/KCNA.

Finally, North Korea's up to 60 Il-28 light bombers built to a 1950s Soviet design would be a capable delivery system. Individual airplanes would have significant trouble penetrating modern air defenses, but with the element of surprise or attacking in large numbers, a few could possibly penetrate to their targets. The Il-28 might also be able to reach American installations on Guam, the site of a major air base and logistics hub currently out of range of North Korea's missiles, on a one-way mission. However, such an attack would be detected far in advance by US, Japanese and ROK air defenses.

Figure 5: Soviet Il-28 Beagle.



Photo: Aircraft Information.

Delivery Systems under Development

North Korea appears to have an ambitious development program focusing on a number of new systems including:

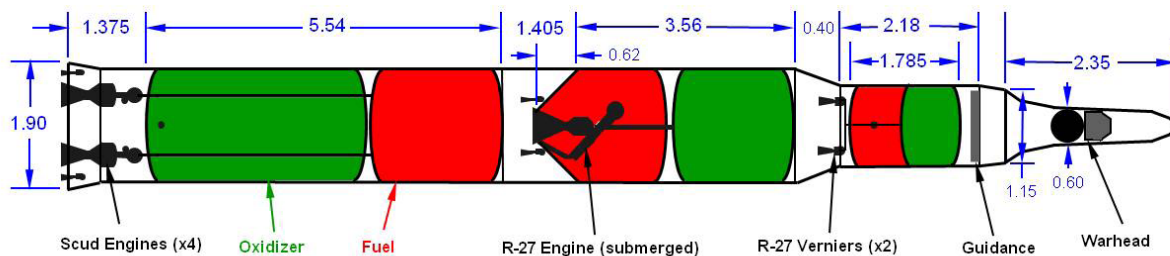
- KN-08 road-mobile intercontinental ballistic missile (ICBM):** Development of this missile began in the late 1990s or early 2000s. While the KN-08 design is original to North Korea, it likely incorporates technologies from the Musudan IRBM and Unha SLV. The KN-08's interior configuration is still subject to speculation. Recent analysis⁷ suggests a range of 7,500-9,000 km, enabling it to reach the West Coast of the United States carrying a warhead package of 500-700 kg. Accuracy would likely be barely adequate to target large cities, mobility would be limited to paved roads, and the system will require 1-2 hours for pre-launch fueling. Some analysts believe the KN-08 is part of North Korea's strategic deception effort since it has not been flight tested but there are reports of ground testing of the missile's first-stage engines. The KN-08 may achieve an "emergency operational status" by 2020 before or with very limited flight testing.

Figure 6: KN-08 mock-up from a July 2013 parade.



Photo: AP/David Guttenfelder.

Figure 7: KN-08 internal configuration.



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- Large liquid-fueled space launch vehicle:** Pyongyang has announced its intention to build an SLV larger than its existing Unha SLV over the next five years. Moreover, beginning in late 2013, the North embarked on a year-long program to upgrade the launch

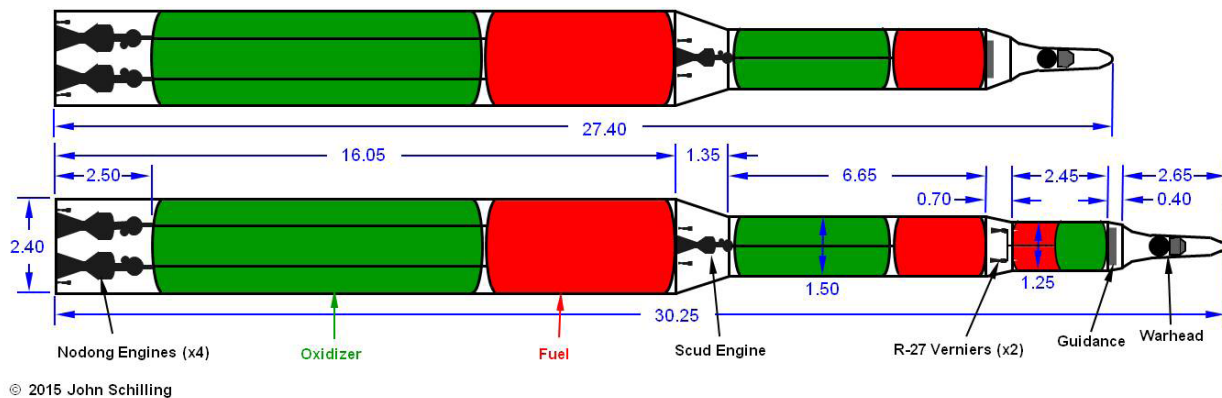
⁷ John Schilling, "Where's that North Korean ICBM Everyone was Talking About?" *38 North*, March 12, 2015, <http://38north.org/2015/03/jschilling031215/>.

gantry at the Sohae Satellite Launching Station to handle a new larger rocket.⁸ While probably intended to place larger satellites into higher orbits, the new SLV may also contribute to the further development of the North's long-range missile program through the testing of common technologies such as high-energy rocket engines, guidance system components and even reentry vehicles (in a sub-orbital mode). A new SLV might also serve as an interim ICBM, supplementing or replacing any deployed Taepodongs.

Figure 8: Artist's concept of a possible larger North Korean rocket.



Figure 9: Postulated military versions of the Unha-3 space launch vehicle.



⁸ "Major Construction at the Sohae Rocket Test Site," *38 North*, August 30, 2013, <http://38north.org/2013/08/sohae083013/>.

- Musudan road-mobile intermediate-range ballistic missile (IRBM):** Pyongyang appears to be moving towards the deployment of this single-stage missile, a slightly longer variant of the old Soviet SS-N-6 sea-launched ballistic missile that incorporates technology from that system.⁹ With a range of 2,500-3,500 km, depending on the weight of its warhead (500-1,000 kilograms), the missile could reach all of East Asia, including important American bases on Guam and Okinawa. While some experts claim the Musudan is also a strategic deception since the system has not yet been flight tested, it seems more likely that it is a work in progress. Indeed, there have been reports that the missile may have already been deployed.¹⁰ Moreover, during the 2013 crisis on the peninsula, media reports indicated that the Musudan had been spotted in the field, possibly preparing for a flight test although such a test never took place.¹¹

Figure 10: Musudan missiles seen in military parades in Pyongyang.

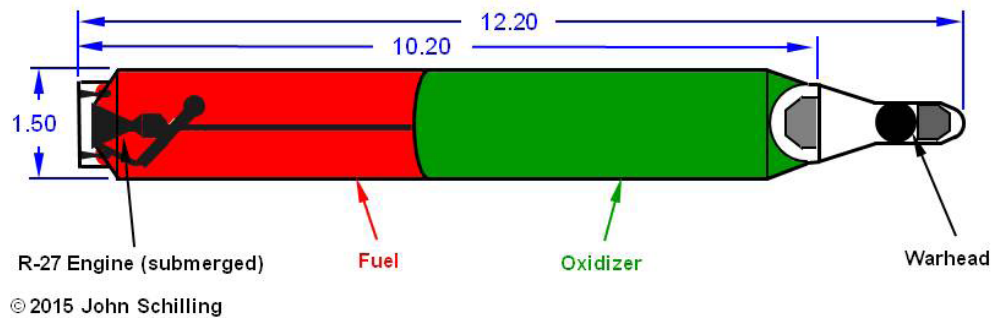


Photo: Korean Central News Agency.

⁹ 150 SS-N-6 missiles remain unaccounted for from the old Soviet inventory and Russian engineers who designed the weapon are known to have worked in North Korea.

¹⁰ Small nuclear powers have in the past deployed nuclear-capable missiles with very limited flight testing. This practice is especially common during the early stages of a country's missile program, when the deployment of nuclear-capable ballistic missiles serves as more of a political tool rather than a tactical military asset. According to some experts, Israel is said to have deployed and armed the Jericho-I missile during the 1973 Yom Kippur War before the system was fully operational possibly to induce action from the United States or to send a signal to Egypt and Syria. Early deployment is also often pursued by countries with financial limitations and time constraints. Pakistan's Ghaury-I missile, for example, has only been tested around ten times since 1998 and continues to suffer from reliability issues.

¹¹ See Kim Eun-jung, "N. Korea loads two medium-range missiles on mobile launches," *Yonhap*, April 5, 2013, <http://english.yonhapnews.co.kr/national/2013/04/05/59/0301000000AEN20130405004351315F.html>.

Figure 11: Musudan external configuration.

- New solid-fuel missiles:** The Toksa SRBM could serve as a test bed for the development of longer-range, solid-fuel missiles, possibly to replace the Scud, that would have distinct advantages—greater mobility and the ability to launch within minutes—over Pyongyang’s current liquid-fueled inventory. North Korea already has extensive experience producing small solid-fuel rockets. Moreover, in mid-2014, it conducted a series of tests of an extended-range Toksa able to fly 160-200 km. However, it is unclear whether those tests reflect the use of a higher-energy solid propellant, a lightening of the missile’s payload or flying the weapon at minimum energy trajectories. Cooperation with Iran, which has already developed such missiles, may represent a more promising alternative path for North Korea.
- Sea-launched land-attack missiles:** Commercial satellite imagery, ROK official statements and other press reports indicate that Pyongyang may be developing a capability to launch ballistic or cruise missiles from surface or cargo ships and from submarines.¹² In the near term, Pyongyang might be able to develop the ability to launch existing short-range cruise or ballistic missiles from sea-based platforms. However, development and deployment of longer-range weapons, particularly submarine-launched ballistic missiles may still be years away. Sea-based land-attack missiles would increase the survivability of North Korea’s nuclear forces, expand its threat to South Korea, Japan and US bases in East Asia and complicate missile defense planning since a mobile platform would be able to attack targets from any direction.

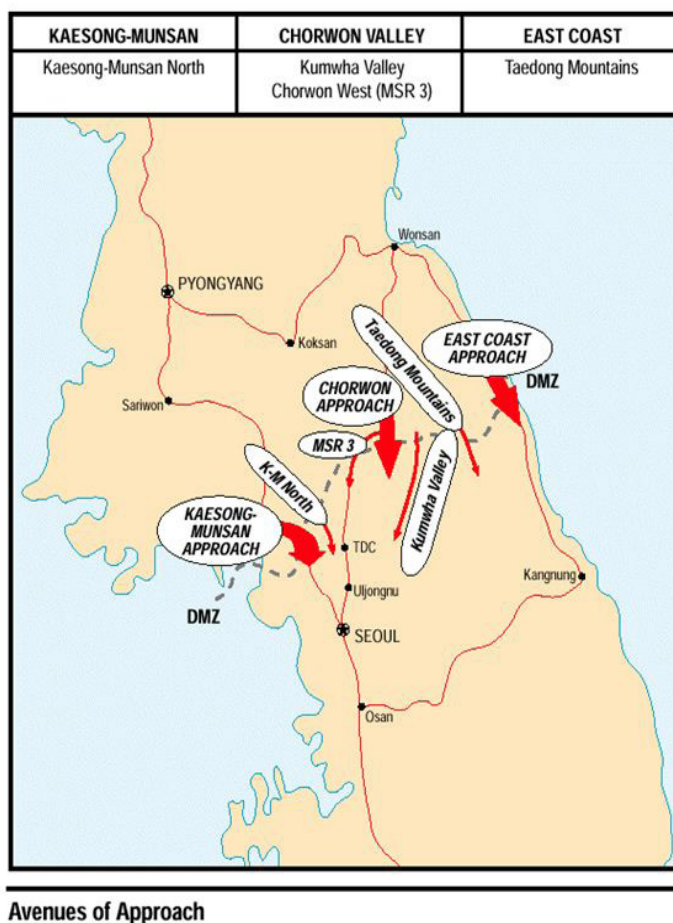
¹² See Joseph S. Bermudez Jr., “The North Korean Navy Acquires a New Submarine,” *38 North*, October 19, 2014, <http://38north.org/2014/10/jbermudez101914/>; and Joseph S. Bermudez Jr., “North Korea: Test Stand for Vertical Launch of Sea-Based Ballistic Missiles Spotted,” *38 North*, October 28, 2014, <http://38north.org/2014/10/jbermudez102814/>.

Figure 12: The new Sinpo-class submarine with an opening in the conning tower that may house 1-2 small vertical launch tubes.



Note: image rotated. Image © 2014 DigitalGlobe, Inc. Annotations by 38 North. All rights reserved.

- **Unconventional delivery options:** North Korea could attempt to deliver nuclear weapons covertly. Doing so, however, would have significant drawbacks, particularly the requirement for a pre-delegation of authority to use the weapon down to the small unit level that would be contrary to the expected preferences of an authoritarian North Korean regime. Two possibilities could be:
 1. The placement of nuclear devices on the Korean peninsula in narrow invasion routes leading into the North in order to block and stun invading forces. In the short term, this approach seems unrealistic since the number of devices needed to accomplish this objective could exceed the North's current small arsenal; and

Figure 13: Avenues of approach across the DMZ.

North Korea Country Handbook, Defense Intelligence Agency.

2. The covert delivery of a nuclear weapon by container ship is also possible given the North's history of using merchant vessels to deploy special operations forces around the world dating back to the 1970s. However, this option also seems implausible because of concerns over command and control as well as the North's lack of commercial interaction with most potential target countries and the dangers of discovery beforehand.

Figure 14: North Korean bulk carrier ship *Chong Chon Gang* (9000 GRT).



Photo: Maritime Traffic.

Future Developments: Significant Hurdles Must Be Overcome

Delivery systems that appear to be under development are an important indicator of North Korea's objectives for the future of its force. If the North continues to move down this road, it will likely focus on the following improvements.

- **Increase range, accuracy and reliability:** North Korea's nuclear delivery systems suffer from limitations in all three areas. While its current systems are capable of reaching most regional targets, improvements in range would allow the North to reach new ones outside the immediate theater, such as Guam, Okinawa, Hawaii or the West Coast of the United States. Better accuracy would open up the possibility of attacking a larger target set beyond soft targets such as cities or large military bases. Improving reliability would provide greater confidence that the missiles would reach and destroy their targets.

In this context, testing—ground, but especially flight testing—will play a critical role, particularly if the North is seeking to deploy more sophisticated delivery systems using high-performance engines and high-speed reentry vehicles. Indeed, testing missiles equipped with these technologies will require establishing a limited infrastructure, such as including downrange ships to monitor data, that may prove challenging.

- **Increase survivability:** Given the limited size of Pyongyang's nuclear arsenal, increasing survivability is essential to withstanding preemptive strikes and to providing significant retaliatory responses. The North's current delivery systems—largely focused on mobile liquid-fueled Nodong MRBMs—would prove difficult to destroy in a preemptive strike. Nevertheless, Pyongyang could take a number of steps to improve survivability, including: 1) basing any Taepodong ICBMs in hardened silos rather than on an above-

ground launch pad;¹³ 2) deploying solid-fueled missiles that allow full off-road mobility and the ability to launch with a few minutes' notice; and 3) basing on ships or submarines that are more difficult to track.

- **Diversify delivery systems:** Diversification of different basing modes—the underlying principle of the US strategic triad of air, land and sea-based weapons—would complicate any effort to launch a preemptive strike, since destroying systems in a short time frame would prove extremely difficult. Second, diversification of different delivery systems could provide greater flexibility/options for the use of nuclear weapons whether on the battlefield, in the theater or directly against the United States.
- **Achieve greater self-sufficiency:** While Pyongyang has built a strong indigenous capability to deploy missiles, largely based on Russian technology and assistance, it has not yet proven itself able to replicate advanced components acquired from abroad, such as Russian high-energy propellant engines, or to move beyond these technologies. In contrast, Iran, Pakistan and other countries with active missile programs have developed more advanced designs, including long-range solid-fueled rockets.

The challenges Pyongyang faces in developing new delivery systems over the next five years and beyond are likely to be greater than those encountered in its nuclear program, where basic designs and production infrastructure are already largely in place. These challenges could result in slower than anticipated progress or even the cancellation of weapons systems under development.

Particularly important will be North Korea's ability to overcome technological and engineering hurdles that more advanced industrialized countries would find daunting. In this context, since the North is not self-sufficient in missile production, the level of foreign assistance could be a critical factor determining how much progress Pyongyang is able to make in critical technologies such as high-performance liquid-fuel engines, solid-fuel rocket motors, high-speed heat shields and reentry vehicles, guidance electronics, sophisticated machine tools and high-strength, lightweight materials. Experienced engineers may also help the DPRK surmount technical hurdles. While Pyongyang has been successful in securing foreign assistance in the past, whether that can continue remains unclear.

Despite all these potential hurdles, it is worth noting that North Korea may have a far less demanding definition of "success" in the development of new missiles than countries like the United States, whose systems are extensively tested before becoming operational to ensure a high degree of reliability. Other small, emerging nuclear powers have had the same view of new missile delivery systems, deploying them with few flight tests or even though they have

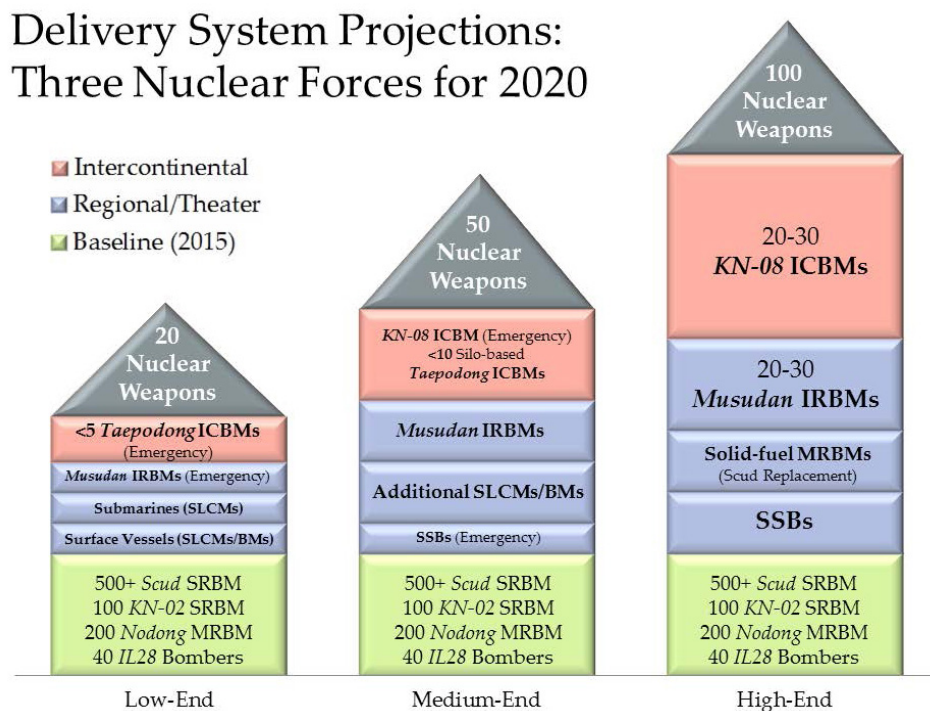
¹³ North Korea has deployed anti-aircraft missiles and radars in small hardened silos since the 1970s. Moreover, Pyongyang has also explored the possibility of basing ballistic missiles in a similar manner since the early 1990s and its scientific literature suggests the North understands key engineering challenges posed by this technology. Speculation has focused on the possibility of silo-basing near the Chinese border for a number of reasons. First, the DPRK military may believe this area is more secure than any other in the North since the US and its allies never reached this area during the Korean War. Second, there may be a view that since this area is close to the Chinese border, the US and South Korea would be reluctant to conduct operations there for fear of dragging the Chinese into a conflict. Finally, the North has already located a number of important defense production facilities in this region, particularly in the northern area.

experienced technical problems. This practice highlights another important consideration for North Korea (and these other countries), namely that deployments of new delivery systems, even if not fully tested, can have an important political purpose in sending deterrence signals to potential adversaries.

Bounding the Problem: Three Scenarios for 2020

In view of the uncertainties in predicting the future of North Korea's delivery systems, projecting low-end, medium and high-end scenarios—taking into consideration the current baseline force, possible key technical objectives and critical determining factors—will provide an illustrative band of possibilities within which a future DPRK nuclear delivery force is more likely to fall.

Figure 15: Delivery System Projections: Three Nuclear Forces for 2020.



Scenario 1: Minimal Modernization

Pyongyang is only able to make marginal improvements; its deterrent remains almost entirely focused on effectively threatening neighbors while posing a symbolic threat to the United States. This scenario assumes that:

- North Korea's test program remains extremely limited. Testing is confined to existing medium- or shorter-range missiles and some limited testing of subsystems such as rocket engines. There are no further launches of SLVs and no tests of new intermediate- and intercontinental-range mobile missiles or key technologies such as reentry vehicles.

- North Korea's ability to access foreign technologies and assistance is significantly constrained. Sanctions and export controls become increasingly effective. Moreover, the North is unable to secure help from foreign scientists and cooperation with other countries—such as Iran—does not yield benefits.
- Pyongyang's level of political and economic commitment could remain high but it may not be able to overcome the limitations imposed on its program by technical and other realities. Alternatively, the level of commitment may lessen because of economic hardships, a decision by Pyongyang that the existing mix of delivery systems is sufficient for its purposes or a changing external security environment that diminishes the need for continued development.

Nevertheless, North Korea may seek to make minimal improvements to the baseline force including two possible new developments:

- North Korea could deploy short-range sea-launched ballistic and cruise missiles. This threat could include merchant ships carrying either type of weapon or the first operational submarine-launched cruise missile.¹⁴ Given the technological challenges in developing such a capability, these weapons would be based on existing North Korean systems, such as the 160 km KN-01 naval cruise missile or the KN-02 SRBM.
- The road-mobile Musudan IRBM could be deployed in an “emergency operational status.” Despite the lack of full-scale flight tests, the North has already conducted extensive development activities for this missile that might enable such a deployment over the next five years if not sooner. Indeed, the reported Musudan deployments in early 2013 as part of escalating tensions on the peninsula may mean that missile has already achieved an emergency status.

Scenario 2: Steady Modernization

North Korea moves forward slowly with the development of new delivery systems able to reach targets in Northeast Asia and the United States, essentially continuing down its current path. This scenario assumes that:

- Pyongyang tests long-range SLVs, at its current pace of about two to three launches every three years. These launches possibly include a new rocket that might be used to test more advanced propulsion and other technologies. The KN-08 ICBM is also flight tested and may serve the same purpose, along with the development of more advanced reentry vehicles. Theater-range testing would include one or two launches of the new road-mobile Musudan IRBM as well as further development of solid-fuel engine technology.

¹⁴ The United States and the Soviet Union explored the possibility of ballistic missile basing on merchant ships during the early years of the Cold War. Iran has demonstrated this capability and North Korea is believed to have studied this option in the past. Recent commercial satellite imagery, ROK government statements and press reports seem to confirm an active effort by the North in this area although that is certainly no guarantee that the program will produce operational results.

- North Korea's ability to acquire foreign technology is slowed by sanctions and export controls but Pyongyang's efforts to secure technology and engineering assistance abroad are still moderately successful. In that context, continued cooperation with Iran yields benefits for its program, particularly solid-fuel technology that could form a foundation for developing systems with longer ranges than the Toksa SRBM in the future.
- Pyongyang's level of political and economic commitment to its WMD and missile programs continues, made possible in part by ongoing steady improvements in the civilian economic sector achieved through gradual reform and interactions with China, Russia and other countries.

As a result, the regional threat becomes even greater than in the first scenario and an operational intercontinental threat begins to emerge. In the theater, in addition to possibly deploying more land-attack cruise missiles on submarines and surface ships as well as ballistic missiles on surface vessels, Pyongyang may develop an emergency operational capability to launch short-range ballistic missiles from submarines. On land, the Musudan IRBM becomes operational after flight testing. An enhanced range KN-02 solid-fueled short-range missile intended to supplement the 300 km Scud might also become operational. In addition, Pyongyang may decide to deploy countermeasures to cope with evolving theater missile defenses deployed by the United States, South Korea and Japan, most of which focus on intercepting missiles inside the atmosphere. This will require emplacing rocket-powered darts as decoys¹⁵ on missiles such as the Nodong and flight testing to ensure the system works.

On the intercontinental level, Pyongyang might consider limited permanent deployments of the Taepodong in hardened silos. Initial flight testing of the KN-08 may allow the North to field that system in an emergency operational status intended mainly for political demonstrations (reliability would be limited to 30-50 percent). The North might also use SLV launches, particularly of a new larger rocket, to further develop advanced technologies that could have applications in military systems.

Scenario 3: Maximum Modernization

North Korea accelerates the deployment of theater and intercontinental delivery systems and begins to explore fielding even more advanced weapons. This scenario is based on the following assumptions:

- Pyongyang pursues an aggressive flight test schedule of three to four launches per year of long-range rockets that yields important technical advances in deploying new systems.
- North Korea is successful in securing hardware and assistance overseas to reinforce its stepped-up flight test program. Cooperative programs with Iran yield important benefits and the North is able to secure additional assistance from foreign governments or individual experts.

¹⁵ The much simpler balloon or chaff-type countermeasures often suggested for countering anti-ICBM missile defenses would be inadequate for these shorter-ranged systems as they would be rapidly decelerated by the atmosphere during the engagement phase.

- Pyongyang's political and economic commitment to these programs increases, possibly as a result of an increased security requirement to enhance the credibility of its deterrent and/or the availability of greater resources due to successful efforts to develop its economy.

In this scenario, a growing theater and intercontinental threat emerges more rapidly. In the theater, the Musudan IRBM achieves an initial operating capability and deployments of missiles increase by 2020. A solid-fuel missile with a range of 300 km intended to replace the Scud becomes operational. Pyongyang might also deploy its first operational sea-launched ballistic missile submarine armed with weapons based on the Nodong MRBM or Musudan IRBM.¹⁶ On the intercontinental level, the KN-08 ICBM reaches an initial operational capability with growing numbers deployed by 2020, though it will probably be limited by the availability of critical components, particularly engines.

Also under this scenario, Pyongyang's missile development program could accelerate with previously over-the-horizon programs becoming more visible by 2020. These programs could include: 1) a second-generation KN-08 ICBM with greater range, utilizing new high-energy engines that could reach targets anywhere in the United States rather than being limited to the West Coast; 2) more sophisticated guidance systems that would substantially increase accuracy; 3) a solid-propellant replacement for the Nodong MRBM; and 4) additional ballistic missile submarines.

A Final Word

Pyongyang's program for developing new nuclear delivery systems, while ambitious, could easily experience difficulties in the future. Much will depend on the critical factors mentioned earlier, particularly its ability to overcome technological and engineering hurdles that, in turn, may depend a great deal on its ability to acquire technology and assistance abroad. Given these potential difficulties, the level of the regime's political/economic commitment to the program will be critical as well. All of these factors are likely to play a much bigger role in the future of North Korea's missile program than in the future of its already proven nuclear weapons program. Moreover, they could result in not just slower progress, but also in the cancellation of new systems under development.

Indeed, when Pyongyang's program is compared to those of countries like Iran and Pakistan, the lack of progress over the past few decades is striking. Both countries relied on North Korean assistance in the 1990s to develop the mainstay of their arsenals—Iran's Shahab missile and Pakistan's Ghauri missiles—that were derived from North Korea's liquid-fueled Nodong. However, both have since made efforts to diversify their programs by pursuing medium- and intermediate-range solid-fueled missiles. Iran's Sejil, a solid-fueled two-stage missile first tested in 2008, is estimated to be in the final stages of development and is believed by some observers to be a replacement for the Shahab that will be more survivable and transportable. Similarly, Pakistan already fields limited numbers of the solid-fueled Shaheen-I and has been developing a longer-range variant, the Shaheen-II, which was test fired in 2004. In comparison, North Korea's

¹⁶ Such a development would probably require foreign assistance from countries or individuals with experience in building ballistic missile submarines.

experience with solid rocket propellants is much more limited, with the overwhelming majority of its arsenal still based on old Soviet technologies and—with the exception of the KN-02—mostly liquid-fueled.

While failure of Pyongyang's development program would severely limit its ability to further develop a direct threat to the United States beyond probably a handful of ICBMs based on old Soviet technology, its existing inventory of approximately 1,000 missiles has sufficient reliability and range to cover most important targets in Northeast Asia. Moreover, the number of systems likely exceeds even the worst-case estimates for North Korea's nuclear inventory by 2020. In short, North Korea has already achieved a level of delivery system development that will allow it to establish itself as a small nuclear power in the coming years.

US·KOREA INSTITUTE AT SAIS

US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

North Korea's Development of a Nuclear Weapons Strategy

JOSEPH S. BERMUDEZ JR.

AUGUST 2015



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Joseph S. Bermudez Jr. is Co-founder and Chief Analytic Officer of AllSource Analysis, Inc. and an internationally recognized analyst, author and lecturer on DPRK defense and intelligence affairs and third-world ballistic missile development. Mr. Bermudez has more than 30 years of experience in the commercial analysis and publications industries. Before founding AllSource Analysis, he served as a senior analyst, editor and author for IHS Jane's, was the publisher and editor of KPA Journal, worked as a consultant to US and foreign governments and was the senior analyst for DigitalGlobe's Analysis Center.

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NORTH KOREA'S DEVELOPMENT OF A NUCLEAR WEAPONS STRATEGY

Introduction

For almost six decades, the Democratic People's Republic of Korea (DPRK or North Korea) has pursued a nuclear program that has gradually developed in size, complexity and capabilities from a small scientific research effort into a comprehensive effort to produce nuclear weapons. At present, North Korea is estimated to possess an inventory of 10-16 nuclear weapons that could rapidly expand by 2020. As this nuclear program has evolved, the North Korean leadership and the Korean People's Army (KPA) have also gradually developed a nuclear strategy for deterrence that appears to have progressed from viewing these weapons as primarily political tools to deter an attack from the United States to operational strategic defensive weapons to inflict unacceptable losses upon attacking forces and assured retaliation, and possibly today, into viewing nuclear weapons as both strategic political weapons and for use in a range of strategic, operational and "battlefield" (i.e., tactical) situations during wartime.

This evolving nuclear weapons strategy has implications for the United States, the Republic of Korea (South Korea), China, and Japan. Up until now, North Korea has been deterred by a complex set of political and military factors. Among these are US security commitments and the presence of US military forces in South Korea and Japan, the strength and capabilities of the South Korean government and armed forces, and the desires of both China and Russia to maintain the status quo in the region. However, the combination of a growing nuclear weapons inventory, a developing ballistic missile force and a nuclear strategy that may be evolving into including options for limited use of these weapons, combined with a new, young and inexperienced leader, could heighten the fears that US extended deterrence will erode and increase the likelihood of greater instability in the region.

North Korean Thinking about Nuclear Strategy (1950-2014)

At the outset, a brief caveat is in order regarding the analysis of North Korea in general and its nuclear weapons program and strategy specifically. Any research looking into these issues is faced with numerous imponderables owing in large measure to the closed and highly centralized nature of the North Korean political system; the nation's strategic, operational and tactical efforts at camouflage, concealment and deception; and the resulting absence of specific, reliable unclassified information. Hence, this discourse relies to a considerable extent on inferential evidence gleaned through prolonged study of North Korea's national security strategy and takes an overarching holistic view.

With those caveats in mind, it is clear that the development of a nuclear weapons strategy in North Korea has occurred within an environment that is based upon a set of overriding strategic principles that inform and influence all aspects of life within the nation, especially political decision making. These principles are: 1) the survival and continued leadership of the Kim family dynasty; 2) deterrence of the United States and its allies; 3) elimination of internal threats; 4) economic development of the nation; and 5) reunification of the Fatherland. Within that context, the evolution of North Korean thinking about the role of nuclear weapons in its defense strategy has taken place in roughly six periods. While these periods are not hard and fast, they present a logical means by which to understand this complicated issue.

Fatherland Liberation War and Reconstruction (1950-1960)

While Kim Il Sung and the North Korean leadership were probably already aware of the bombing of Hiroshima and Nagasaki with the atomic “doomsday” weapon, in part through stories told by returning Koreans who survived the attack, the belief in the assured destructiveness of nuclear weapons and the lack of defense against them was significantly reinforced by US threats to employ these weapons to end the Korean War. These threats had the desired effect—an Armistice Agreement was reached—as well as a truly profound impact on the North Korean leadership’s thinking that cannot be overstated. The danger that US nuclear weapons might be used against the North has been a central principle in its strategic thought and actions ever since.

The nuclear threat resulted in practical steps. First, even before the signing of the Armistice Agreement the KPA began to address what was then called “ABC” (atomic, biological and chemical) weapons by reestablishing chemical defense units. These units were responsible for defensive preparations against a nuclear attack. During the immediate post-war years the KPA initiated a series of national level “Atomic Warfare” defensive exercises and subsequently established an “Atomic Weapons Training Center” near Kilchu to train division-sized units to conduct conventional operations (offensive and defensive) on an “atomic” battlefield.

Second, Pyongyang began to lay the groundwork for the development of its own rudimentary nuclear scientific infrastructure. The Academy of Sciences expanded a program begun before the war that sent promising individuals to the Soviet Union to be trained as scientists and technicians in related fields. Some of these individuals would subsequently come back and play crucial roles in the North’s nascent nuclear program. By the end of the war, the North had established a basic “atomic” research program at Hungnam. During the late 1950s, several nuclear cooperation agreements were signed with the Soviet Union and related curricula were established at Kim Il Sung University and Kim Chaek College of Science and Technology. Funds for these activities were allocated in the 1956-1961 5-Year Economic Plan.

Substituting Chemical Weapons for a Nuclear Deterrent (1960-1976)

Frustrated by the North’s inability to take advantage of civil unrest in South Korea during the 1960s, Kim Il Sung initially enunciated a strategic vision known as the “Four Military Lines” that called for the arming of the whole people, the fortification of the entire country, the training of soldiers as a cadre force and the modernization of arms. Kim subsequently expanded upon this to include supporting revolution in the South and international revolutionary movements. During

the mid-to-late 1960s, tensions on the peninsula escalated as the North oversaw an increasing level of aggression—guerilla warfare operations and assassination attempts in the South—as well as acts against the United States—the capture of the *USS Pueblo* in 1968 and the shooting down of an American EC-121M reconnaissance aircraft in 1969. This escalation brought what the North Korean leadership perceived as new US nuclear threats and renewed fears from the Fatherland Liberation War. It ended with Kim's purge of the "Partisan Generals," one of the strongest political factions not completely under his control that oversaw these operations and also interfered in domestic affairs. Aside from eliminating the last major obstacle to Kim's complete control of North Korea, with the purge, KPA strategy and doctrine began to transition away from guerrilla warfare to combined operations employing both conventional and special operations forces.

During this period, the North also continued to expand its nuclear research infrastructure through three steps:

- The program sending promising individuals to the USSR to be trained as scientists and technicians in related fields continued to grow, although the availability of sufficient numbers of fully qualified personnel would present a challenge throughout this period.
- Building upon previous experience, earlier agreements with the Soviet Union and funding from the first 7-Year Economic Plan (i.e., 1961-1967), the Academy of Sciences embarked upon what may be called first phase development of its nuclear program. In 1962, two atomic energy research centers were established at Pakchon and Yongbyon where the North's first nuclear research reactor and a 0.1 MWt critical facility for the production of medical and industrial isotopes as well as basic research were installed.
- The reorganization of the North's military-industrial infrastructure as well as the establishment of the Second Economic Committee and the Academy of Defense Sciences laid the organizational foundation for the research, design and production of nuclear weapons. These organizations faced significant challenges in rationalizing a diverse, inefficient and highly politicized weapons research, development and production system often at odds with itself.

The continuing reconstruction of North Korea's industrial and agricultural capabilities, aside from allowing for the modernization and expansion of the KPA, including the domestic production of a large percentage of its weapons, also facilitated the development of a large chemical industry. By the end of the decade, it appears that the North had begun production of chemical weapons, a decision probably meant as a response to the threat of US nuclear weapons and the belief that these weapons could help deter such threats. Further manifestations of this concern over the US nuclear threat were the establishment of a systematic program for the construction of underground facilities and a new emphasis on operations on the chemical and nuclear battlefield in KPA training. The Soviet Union is also believed to have provided some assistance in advanced defensive nuclear, biological and chemical (NBC) training and small quantities of related equipment. By the mid-1970s, the DPRK seems to have been well prepared for passive NBC defense while also possessing an offensive chemical warfare (CW) capability.

Since the production of nuclear weapons was likely only an aspirational goal at this time, the development of any coherent strategy built on these weapons had not begun. However, the North viewed chemical weapons as a viable substitute that, in combination with an expanding and modernizing KPA, could successfully deter the use of nuclear weapons by the United States.

Nuclear Weapons as Political/Diplomatic Symbols (1976-1989)

The transition in KPA strategy from guerrilla warfare to a focus on asymmetric warfare based on employing conventional and special operations forces continued, reinforced in part by lessons learned from the 1980-1988 Iran-Iraq War such as the utility of ballistic missiles and the effectiveness of massive use of artillery. It was also supported by the continued production of chemical weapons, the introduction of large numbers of new artillery systems, the mechanization of the ground forces, the expansion in the size of the armed forces and the introduction of short-range Scud ballistic missiles. This expansion and modernization was facilitated during the mid-1980s by a rapprochement with the Soviet Union, which provided deliveries of modern weapon systems, training and other military and economic assistance.

By the late 1970s, planning was well underway for the second phase development of the North's nuclear infrastructure that would take place through the 1980s. This phase included the construction of new reactors, a radiochemical separation plant, the establishment of additional research centers and a host of supporting developments. By the end of this period, the nuclear program had transitioned to the production of weapons-grade plutonium and the design of a weapon. By the mid-1980s North Korea was believed to be well on its way to producing prototype first generation implosion designs, including for a missile warhead, as a prelude to the production of fissile material.¹

Pyongyang's nuclear program entered a new phase at the end of that decade. Numbers of personnel sent overseas earlier to train in fields useful for developing a domestic nuclear program declined. The majority—many born during or immediately after the war and raised in a system that viewed the US as wanting to use nuclear weapons against the North—would now come out of domestic educational programs that continued to expand. Planning had also begun for a third phase of nuclear infrastructure development including construction of additional reactors and facilities (e.g., a 200 MWt reactor, waste storage facilities, etc.). Complementing this thinking was the acquisition of MiG-23 and MiG-29 aircraft, Scud B ballistic missiles, the establishment of a domestic ballistic missile production infrastructure and planning for longer-range ballistic missiles that supported KPA thinking about the need for nuclear weapon delivery systems.

As Pyongyang's nuclear development program advanced and missile and aircraft delivery systems were acquired, the KPA initiated a systematic study of US, Soviet and Chinese nuclear warfare concepts and strategies. By 1989, a rudimentary deterrence strategy had been developed that focused on the political and diplomatic utility of nuclear weapons rather than as tools to fight a war. The view appears to be supported by Kim Il Sung's reported pronouncement during

¹ It is conceivable that there may have been competing nuclear weapons designs from different research departments and institutes, and possibly an experimental or research HEU program using Calutrons and an associated HEU bomb design. Such programs could have been supported by the availability of relatively plentiful electricity during this period. Any such HEU program, however, was likely terminated by the early 1980s as all resources were focused upon the Pu program.

this period that nuclear weapons could not be used on the Korean peninsula due to its small size. In the minds of the North Korean leadership, the correctness of pursuing nuclear weapons as tools to enable room for political maneuvering was likely reinforced by the international political pressure brought to bear to compel them to sign the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1985. Until the time when nuclear weapons would become available, it appears that the North Korean leadership still viewed chemical weapons and expanding conventional armed forces, combined with emerging asymmetric capabilities, as the primary means of deterring the threat of US nuclear weapons.

Strategy Refined (1989-early 2000s)

This period, the most tumultuous in North Korea since the Korean War, included the collapse of its Soviet ally, China's rapprochement with South Korea, the rapid US victory over Iraq in Operations Desert Storm/Desert Shield, the death of Kim Il Sung and a deteriorating economy as well as widespread famine. Under these circumstances, in 1994, the North sought to capitalize on the political and diplomatic utility of nuclear weapons by accepting significant limits on its fissile material production program in the 1994 US-North Korea Agreed Framework in return for better relations with the United States. While the Agreed Framework froze the North Korean plutonium production program and effectively disabled much of Pyongyang's third phase nuclear infrastructure construction projects, it did not result in the elimination of the North's nuclear weapons ambitions or program.

Despite the 1994 agreement, Pyongyang continued, at the very least, to hedge against the possible failure of that arrangement and to consider the possible role of nuclear weapons in its future defense strategy. Nuclear research and development programs continued, as did the development of ballistic missiles—although longer-range weapons were subject to an agreed test moratorium with the United States. While foreign personnel would occasionally provide lectures or training, the nuclear program now received sufficient numbers of personnel from indigenous educational programs. The notable exception was the relationship with Pakistan and AQ Khan, which was initiated during the early 1990s during a visit by Prime Minister Benazir Bhutto to Pyongyang. By the end of the decade, that relationship would allow the North to move forward with a uranium enrichment program. Work on nuclear weapons design progressed, possibly to second-generation designs. Nuclear cooperation with Iran is believed to have also begun during this period although the level of cooperation and the effect it had upon the North Korean nuclear program is unclear.

In the midst of these events, Pyongyang's thinking about nuclear strategy also evolved. Detailed study of Operation Desert Storm probably resulted in the conclusion that the North's chemical weapons did not hinder the US from soundly defeating that nation nor could they deter nuclear use on the peninsula. Rather, chemical weapons were now increasingly viewed as basic tools with which to fight a war. Only nuclear weapons were seen as serving to deter the US nuclear threat and as political tools to ensure the North's deserved political prestige on the international stage. KCNA would state that:

The bloody lesson of the war in Iraq for the world is that only when a country has physical deterrent forces and massive military deterrent forces that are capable of overwhelmingly defeating any attack by state-of-the-art weapons, can it prevent war and defend its independence and national security.²

The adoption of a deterrence strategy, based on the KPA's study of other countries' nuclear strategies as well as the Iraq experience emerged in the early 2000s. This was after the collapse of the 1994 Agreed Framework when the North may have achieved an emergency nuclear capability based on a handful of weapons and ballistic missile delivery systems, primarily the Nodong medium-range ballistic missile. (Ballistic missiles were also a key component in the North's evolving asymmetric warfare strategy that had been given a new impetus during the decade as famine and economic collapse resulted in a decline in conventional military strength and an increase in weapons reaching obsolescence.) This in turn led the KPA to establish the Ballistic Missile Training Guidance Bureau to oversee the training, deployment, operation and development of doctrine for all ballistic missile units.

Supporting the evolving views of nuclear deterrence, there was a gradual shift in North Korean language about responses to US nuclear threats, emphasizing the role of these weapons as a political tool, reflected in rhetoric about the use of overwhelming artillery, conventional ground forces and ballistic missiles as well as Pyongyang's right to possess nuclear weapons as a deterrent to the US nuclear threat. For example, a 2002 Foreign Ministry statement declared that North Korea is:

...entitled to have nuclear weapons and more [powerful weapons] than those to safeguard our sovereignty and right to survive in response to the increasing US threat of crushing us with nuclear [weapons].³

Assured Retaliation Emerges (Early 2000s-2014)

North Korea's development of a nuclear force and strategy to deter the United States and to ensure regime survival continued during the years leading up to Kim Jong Il's death and afterwards. Two events—Libya relinquishing its WMD programs under pressure from the United States in 2003 followed eight years later by the March 2011 US attack on that country and the 2007 Israeli airstrike destroying a North Korean reactor under construction in Syria at al-Kibar—reinforced Pyongyang's view that neither event would have occurred had those nations possessed nuclear weapons. Indeed, key nuclear and missile programs accelerated under Kim Jong Il and became more visible at the end of his life. Since his death, Pyongyang under Kim Jong Un's leadership, has taken political steps to emphasize the importance of nuclear weapons, including enshrining their possession in its Constitution and emphasizing the simultaneous development of these weapons and the North's economy (the “byungjin” line).

Important developments point to the further elaboration of requirements for deterrence to buttress assured retaliation and perhaps some initial thinking on the use of nuclear weapons in a wider range of contingencies:

² “US ‘Ruptured’ Denuclearization Process,” *KCNA*, May 12, 2003.

³ “Foreign Ministry Statement,” *KCNA*, October 25, 2002.

- The reorganization of the Ballistic Missile Training Guidance Bureau into the Strategic Forces Command that appears to have the same status as the ground forces, Navy and Air and Anti-Air Commands, a clear indication of the elevated significance of ballistic missiles as a deterrent in the North's defense strategy.
- The continued acquisition of weapons necessary to further develop a survivable nuclear force and better able to fulfill a deterrence mission including: longer-range mobile weapons—the Musudan intermediate-range ballistic missile (IRBM) and the KN-08 intercontinental ballistic missile (ICBM)—and possibly sea-launched cruise and ballistic missiles based on surface ships or submarines.
- Significant progress in the production of fissile material, including the unveiling and expansion of a modern uranium enrichment facility and bringing back online a small plutonium production reactor as well as striving to develop more advanced, miniaturized weapons that can be mounted on delivery systems. During this period, Pyongyang conducted three nuclear tests presumably for this purpose and has made numerous public references to the importance of developing miniaturized nuclear warheads for ballistic missiles.
- North Korea has conducted a growing number of ballistic missile exercises during the last five years that have increased in size, realism (e.g., shoot-and-scoot), complexity (e.g., volley and time-on-target fire missions) and demonstrated capabilities (e.g., atypical flight trajectories). These capabilities are applicable to the use of both conventional and nuclear weapons in wartime.

The past five years have also witnessed a new sophistication in the North's articulation of its nuclear weapons strategy—the practical military application of these weapons and their utility in pursuing political priorities—that may be intended for external as well as internal audiences.⁴ Much of the rhetoric is very similar to US and Russian terminology with nuclear weapons usage characterized in battlefield, operational and strategic terms. However, while these statements on the surface suggest an important evolutionary step in the North's thinking about deterrence and strategy, they may also be understood as political rhetoric employed to mimic US statements or as an aspirational objective of KPA planners given the current small size of the North's nuclear stockpile and limited delivery capabilities.

Nuclear Strategy in 2020

All of these developments would seem to indicate that Pyongyang is striving for a policy of deterrence based, at the very least, on a more credible assured retaliation capability. This approach is reflected in North Korea's policy adopted by the Supreme People's Assembly (SPA) in 2013: "(Nuclear weapons) serve the purpose of deterring and repelling the aggression and attack of the enemy against the DPRK and dealing deadly retaliatory blows at the strong holds of aggression...."⁵

⁴ This language and terminology is reflected in the Supreme People's Assembly Law as well.

⁵ "Law on Consolidating Position of Nuclear Weapons State Adopted," *KCNA*, April 1, 2013.

The key question for the future is whether Pyongyang has the ambition to establish deterrence based on a strategy beyond assured retaliation that includes options for the limited initial use of nuclear weapons in order to bolster the credibility of deterrence. The SPA “Law on Consolidating Position of Nuclear Weapons State,” appears to at least posit the expansion of the role of nuclear weapons beyond deterring high-end attacks to also deter and repel lower levels of aggression using its nuclear weapons as a future objective. The law states:

The DPRK shall take practical steps to bolster up the nuclear deterrence and nuclear retaliatory strike power both in quality and quantity to cope with the gravity of the escalating danger of hostile forces’ aggression and attack.⁶

Logically, it may make sense for Pyongyang to move beyond relying on assured retaliation to a posture that threatens the limited early use of nuclear weapons to deter attacks by superior conventional forces. Just like NATO confronted by the Soviet Union during the Cold War and Pakistan faces India today, Pyongyang faces more capable American and South Korean conventional forces. However, if the North evolves in this direction, it will have to address some difficult challenges that will increase as the country’s nuclear inventory continues to grow and its arsenal of delivery systems expands.

Many of these challenges revolve around the classic question of “how much is enough” to deter the United States and other potential enemies, a question faced by every country that has decided to build nuclear weapons. While that determination is often driven by factors other than logic—such as technological momentum, resource constraints, and bureaucratic and political considerations—a related question is “what will be the DPRK’s theory of victory in a conflict that may involve threats or even the use of nuclear weapons?” That, in turn, would seem to lead to the possibility of the North considering whether nuclear weapons would be an appropriate response to a limited conventional attack as well as determining when and where to use these weapons.

There are hints that Pyongyang may move to address this question. The Central Committee of the Workers’ Party of Korea (WPK) released a report one day before the SPA Law was issued directing the military to begin such planning:

The People’s Army shall perfect the war method and operation in the direction of raising the pivotal role of the nuclear armed forces in all aspects concerning war deterrence and war strategy, and the nuclear armed forces should always round off the combat posture.⁷

But if Pyongyang does move down this road as its nuclear stockpile grows and its delivery systems diversify, it will face a number of additional hurdles. One major challenge will be the issue of command and control, namely can Pyongyang adopt a model that requires some pre-delegation of release authority for nuclear weapons in order to make the threat of early use credible, particularly given the assumption that an authoritarian regime like North Korea will be loathe to do so. Indeed, at least as of today, launch authority remains highly centralized and the

⁶ Ibid.

⁷ “Kim Jong Un Guides Party Plenary Meeting,” *KCNA*, March 31, 2013.

prerogative of the “Supreme Commander of the Korean People’s Army.” While change in this practice appears unlikely, predicting the future is complicated by the reality that Kim Jong Un’s leadership style is still evolving.

A number of other challenges will also have to be addressed by the North should it choose to move in the direction of planning for the possible limited use of nuclear weapons in response to a conventional attack. These include:

- The advanced deployment of delivery systems with their nuclear weapons to units as well as the necessary security for those deployed systems;
- A far greater requirement for coordination of nuclear use—tactics and doctrine—with ground force plans and operations to avoid high personnel and equipment losses;
- Access to greater real-time intelligence to address the fluidity of the modern battlefield, prevent a nuclear strike that would hit friendly troops and to maximize the effects of a strike on enemy forces; and
- More sophisticated command and control equipment and networks that work in concert with real-time intelligence to ensure friendly troops are not in the target area of a nuclear strike and more significantly control support, planning and firing commands that nuclear weapons units require to launch an effective strike. These command and control networks, and their associated equipment, have to be robust and secure enough to withstand concerted attack from an enemy.

Aside from technological and operational challenges, an additional factor to consider in predicting the future of Pyongyang’s nuclear strategy is unique national circumstances. North Koreans often argue that military hardware has to be adapted to Korean circumstances and realities, an argument that probably also applies to nuclear weapons and seems relevant given Kim Il Sung’s past skepticism about the use of these weapons. To the extent that Pyongyang’s war plans are based on the expectation of actually winning a war and inheriting South Korea’s wealth, avoiding widespread, indiscriminate and unnecessary damage would seem to be important, once again driving the North in this direction. However, even in the context of building a force of more accurate, lower yield nuclear weapons, there also may be a significant political/psychological barrier to their use by North Korean leaders on the peninsula, namely these weapons would be used against the Korean people.

Keeping in mind the development of North Korea’s deterrence strategy over time, that strategy’s most recent manifestations and the possible technical, political and other challenges facing Pyongyang in formulating a future approach, how might its nuclear strategy evolve in the future? An earlier paper in this study posited three scenarios for the future of North Korea’s nuclear weapons stockpile and delivery systems until 2020.⁸ Those scenarios were:

⁸ David Albright, “Future Directions in the DPRK’s Nuclear Weapons Program: Three Scenarios for 2020,” US-Korea Institute at Johns Hopkins School of Advanced International Studies, February 2015, <http://38north.org/2015/02/dalbright022615/>.

1. A small nuclear stockpile of 20 weapons and delivery systems that are focused primarily on targets in Northeast Asia with an emergency operational capability to field a few ICBMs;
2. A larger stockpile of 50 weapons once again focused primarily on Northeast Asia (there would be a greater diversification of these systems to include more modern mobile theater range missiles and more sea-based systems) and a greater ICBM threat; and
3. A stockpile of 100 weapons with an even greater ability to attack targets in Northeast Asia and the United States.

While it is unclear whether capabilities will be driven by strategy or vice versa, for the purposes of this study, it is assumed that strategy will continue to evolve depending on the size of Pyongyang's stockpile and the capabilities of these delivery systems. Taking into account these capabilities, North Korea's nuclear strategy may change along the following lines.

1. Low-end Scenario

In this scenario, North Korea will be armed with 20 nuclear weapons and will be able to field only minor improvements in its current force of 1,000 ballistic missiles able to reach most targets in Northeast Asia, including limited deployments of rudimentary sea-launched systems and possibly the fielding of the road-mobile Musudan IRBM in an emergency operational status. (A small number of Taepodong ICBMs may also be deployable in an "emergency operational status.") Pyongyang seems likely to continue to rely on a policy of assured retaliation, threatening the use of these weapons in response to a nuclear attack by the United States. If necessary, the use of these weapons against targets in South Korea will be allowed only under extreme conditions. The threshold for use against targets in Japan may be lower.

2. Medium Scenario

In this scenario, Pyongyang's nuclear deterrent will grow to 50 weapons with a growing variety of yields—most in the 10-20 kiloton range, but with a few that may reach 50 kilotons. Its delivery systems will include additional mobile theater-range missiles, including the new road-mobile Musudan IRBM that could become operational after a limited number of tests and possibly including greater numbers of weapons based at sea. In addition, Pyongyang's KN-08 road-mobile ICBM could achieve an "emergency operational status" as it moves to an operational capability. A concerted research, development and production program will allow for the deployment of 2-4 sea-launch ballistic missile systems. As a result of these developments, Pyongyang will possess a more survivable and robust assured retaliatory capability able to more credibly threaten targets in Northeast Asia and the United States. Pyongyang's greater assured retaliatory capability may allow for the development of some limited options for the use of these weapons in a conflict against theater targets, particularly in Japan. Still, the limitations on nuclear use on the Korean peninsula will likely remain significant.

3. *High-end Scenario*

In this scenario, North Korea would successfully accelerate its development and deployment of nuclear weapons and delivery systems. As a result, Pyongyang's nuclear stockpile would grow to 100 weapons by 2020 and include significant advances in weapons design such as miniaturization and a wider variety of yields. These weapons could be delivered by a growing array of battlefield, theater and intercontinental delivery systems including a new solid-fuel missile to replace the SCUD, greater deployments of Musudan IRBMs, the fielding of operational KN-08 ICBMs and the deployment of more capable sea-launch ballistic missile systems.

While Pyongyang would certainly have an even more robust assured retaliation capability, because of the size of the force as well as its variety of delivery systems and nuclear devices, the North could consider a further evolution in its nuclear strategy beyond assured retaliation and allow for threatening "first use," but probably only under certain conditions (e.g., the leadership perceives that a ROK or US invasion is imminent). In that context, battlefield nuclear weapons would be integrated into Pyongyang's war plans and the limited use of these weapons on the peninsula would be provided for also under certain conditions. The threshold for use against Japan would be lowered as well.⁹

Should North Korea produce smaller tactical nuclear weapons, these would likely present challenges to their strategists and planners. Available information suggests that Kim Jong Un and the North Korean leadership hold the belief that any nuclear weapons usage against the North would be a strategic attack designed to eliminate the leadership and subjugate the nation. There is also the stated belief of Kim Il Sung that the small size of the Korean peninsula makes the use of nuclear weapons impractical. This same information suggests they believe that any North Korean nuclear weapons usage would be interpreted as a strategic operation. Moreover, there is the challenge of integrating tactical and operational nuclear weapons usage into known KPA strategies and doctrines. Complicating these factors is that a dichotomy of thought may exist within North Korea concerning the utility of nuclear weapons with low and mid-level military and civilian specialists having a realistic understanding and senior leaders attributing these weapons with far greater political, physical and military capabilities than is justified.

In this context, Pyongyang would probably have no such hesitation in using nuclear weapons against Japan. It would not be hard to imagine that if the tide turned against the North, in part, because of Japan's role in assisting the US and South Korea, Pyongyang would not hesitate in using these weapons against civilian and military targets in that country.

⁹ Nuclear strategies do not necessarily dictate how these weapons might actually be used during crisis or conflict. "No first use" can quickly become first use and a "first use" strategy could be overridden in favor of restraint.

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US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

North Korea's Evolving Nuclear Strategy

SHANE SMITH

AUGUST 2015



NORTH KOREA'S
NUCLEAR FUTURES SERIES

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Dr. Shane Smith is a Senior Research Fellow at the National Defense University's Center for the Study of Weapons of Mass Destruction. His current research focuses on strategic stability and the role of nuclear weapons in Asia-Pacific affairs, extended deterrence, and North Korea's nuclear program. He is also a Special Advisor at the Defense Threat Reduction Agency, where he helps shape and support a strategic engagement and applied research program aimed at reducing WMD dangers. In 2007, Dr. Smith helped launch the WMD Center's Program for Emerging Leaders and was the Program's Director from 2008 to 2012. He has taught national security and nuclear policy related courses at the University of Colorado at Boulder, the National Defense University, and at Johns Hopkins University. Before joining the WMD Center, Dr. Smith worked for former Secretary of Defense William Perry and former Deputy Secretary of Defense Ashton Carter at the Harvard-Stanford Preventive Defense Project. He was also a Research Associate for National Security Studies at the Council on Foreign Relations, where he coordinated two nuclear policy task forces, and a Research Assistant at the Russian-American Nuclear Security Advisory Council. He has published in edited volumes, academic journals, and leading newspapers. Most recently, he co-authored a chapter in Etel Solingen (ed.), *Sanctions, Statecraft, and Nuclear Proliferation* (Cambridge University Press, 2012) and authored a chapter in Jeffrey Larsen (ed.), *Responding to Catastrophic Events: A Consequence Management Reader* (Palgrave MacMillan, 2013).

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NORTH KOREA'S EVOLVING NUCLEAR STRATEGY

Introduction¹

Over the past two decades, North Korea's nuclear program has grown from a proliferation problem to a military threat to its neighbors and the United States. The country is now estimated to possess enough fissile material to build anywhere from six to about thirty nuclear weapons, depending largely on how much highly enriched uranium it has produced, and is poised to grow its stockpile, perhaps dramatically, over the coming years.² North Korea has conducted three increasingly powerful nuclear tests since 2006 as well as a series of missile launches, suggesting to some that it could sooner or later target the US homeland.³ If that were not enough, the North has made excessively bold and even preemptive nuclear threats under the leadership of Kim Jong Un.⁴

While North Korea's nuclear capabilities and threats have grown, little attention has been paid to its emerging nuclear strategy for three reasons. First, there is a common caricature of North Korea as backward, unserious and incompetent that has led some to dismiss and downplay its nuclear efforts over the years. Only after its third nuclear test, in 2013, have many analysts begun to take North Korea's nuclear capabilities seriously. Second, there is a tendency for nuclear scholars to bypass North Korea because, as one suggests, "almost nothing is known about North Korea's nuclear arsenal or the doctrine by which those weapons might be employed."⁵ North Korea and its nuclear program are far from transparent, but this is not a unique problem. US scholars struggled for two generations to understand nuclear thinking in the Soviet Union based on sketchy evidence. It would be a mistake now, just as it would have been then, to throw our hands into the air. Moreover, a surprising amount of evidence about North Korea's nuclear program actually exists from its past nuclear and missile tests, policy pronouncements and military parades as well as from commercially available satellite imagery.

¹ This paper represents the author's personal views and does not necessarily reflect the views of the National Defense University, the Department of Defense, or any part of the US government.

² David Albright, "Future Directions in the DPRK's Nuclear Weapons Program: Three Scenarios for 2020," US-Korea Institute at SAIS, February 2015, <http://38north.org/wp-content/uploads/2015/02/NKNF-Future-Directions-2020-Albright-0215.pdf>.

³ John Schilling and Henry Kan, "The Future of North Korean Nuclear Delivery Systems," US-Korea Institute at SAIS, April 2015, http://38north.org/wp-content/uploads/2015/04/NKNF_Delivery-Systems.pdf.

⁴ "Second Korean War Is Unavoidable: DPRK FM Spokesman," *KCNA*, March 7, 2013.

⁵ Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, NJ: Princeton University Press, 2014), 1.

The third reason North Korea's nuclear strategy receives scant scholarly attention is that many analysts assume that non-military goals drive its nuclear decision making. Some argue that its program is primarily aimed at garnering international prestige or rallying domestic support around a leadership with few other claims of success.⁶ Others see financial motivations; a North Korea bent on trading its technologies to countries like Iran and Syria.⁷ Still others believe that its nuclear program is a bargaining chip or blackmailing tool to gain diplomatic concessions.⁸ Such motivations do not lend themselves easily to rational-actor-based strategic analyses that explore connections between means and ends.⁹ Yet, it would be a mistake to assume that North Korea's nuclear program is not guided by strategic logic. Its leaders must certainly weigh the costs and benefits of its nuclear investments and actions over time, given their resource limitations and the security risks they run by driving up military tensions.

To be sure, North Korea's leaders have consistently justified developing nuclear weapons for security purposes.¹⁰ A small but growing body of work explores these military dimensions and how North Korea might operationalize and employ nuclear weapons.¹¹ Sorely missing, however, is a systematic treatment of the different nuclear strategies North Korea may consider in the coming years.

Building on a long and rich literature that has been advanced most recently by Vipin Narang, this paper offers an analytical framework for four alternative North Korean nuclear strategies:¹² 1) a strategy aimed at extracting international political or diplomatic concessions; 2) a strategy aimed at internationalizing crises on the Korean peninsula in a way that triggers US and/or Chinese intermediation; 3) a retaliatory strategy to deter regime-threatening attacks; and 4) a nuclear war-fighting strategy to offset conventional weaknesses vis-à-vis South Korea and the United States. The paper then assesses the limited evidence about North Korea's nuclear strategy—where it has been and where it is going.

In short, the available evidence makes it difficult to dismiss the idea that North Korea's past nuclear-related decisions may have been driven primarily by political or diplomatic motivations. During the 1990s and early 2000s, the North was willing to trade away significant elements of its nuclear program for various concessions at different times. While these trades never

⁶ Benjamin Habib, "North Korea's Nuclear Weapons Programme and the Maintenance of the Songun System," *Pacific Review* 24, no. 1, 2011: 43–64.

⁷ Graham T. Allison, Jr., "North Korea's Lesson: Nukes for Sale," *New York Times*, February 12, 2013.

⁸ Andrei Lankov, *The Real North Korea: Life and Politics in the Failed Stalinist Utopia* (New York: Oxford University Press, 2013), 149.

⁹ Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of the Bomb," *International Security* 21, no. 3 (Winter 1996–1997), 54–86.

¹⁰ "Rodong Sinmun on DPRK's legitimate right to self-defence," *KCNA*, December 20, 2002.

¹¹ For instance, see Bruce E. Bechtol, Jr., "Planning for the Unthinkable: Countering a North Korean Nuclear Attack and Management of Post-Attack Scenarios," *The Korean Journal of Defense Analysis* 23, no. 1, March 2011: 1–18; Peter Hayes and Scott Bruce, "Translating North Korea's Nuclear Threats into Constrained Operational Reality," in Gregory J. Moore (ed.), *North Korean Nuclear Operationality: Regional Security & Nonproliferation* (Baltimore, MD: Johns Hopkins University Press, 2014), 15–31; and Terence Roehrig, "North Korea's Nuclear Weapons Program: Motivations, Strategy, and Doctrine," in Toshi Yoshihara and John R. Holmes (eds.), *Strategy in the Second Nuclear Age: Power, Ambition, and the Ultimate Weapon* (Washington, DC: Georgetown University Press, 2012), 81–98.

¹² Narang, *Nuclear Strategy in the Modern Era*.

amounted to “denuclearization,” North Korea agreed to abide by measures that substantially—if temporarily—restrained its nuclear capabilities. To the extent that North Korea’s nuclear decisions were primarily motivated by political and diplomatic goals in the past, however, those days appear to be gone for the foreseeable future.

Since the North’s first nuclear test, the specter of nuclear war has hung over every crisis on the peninsula. With an ambiguous weapons capability, North Korea has made over-the-top nuclear threats that appear to be designed to grab headlines and international attention rather than to convey serious military warnings. These threats could be seen as part of a strategy to internationalize crises by raising the global stakes and compelling intervention by the United States or China or both to restore stability and restrain South Korea. However, a strategy that relies on third parties to intervene is inherently unsatisfying and likely untenable over time for any leader with options for a more robust nuclear strategy. Thus, North Korea indeed appears to be pursuing other options.

It now has in place investments and policies that suggest near-term ambitions for a survivable, second-strike capability to deter regime-threatening attacks and coercion. For instance, North Korea has a fissile material production infrastructure that could allow it to grow and diversify its arsenal in dramatic ways over the coming years. It has long invested in building short-, medium- and intercontinental-range ballistic missiles that are mobile and can therefore take advantage of mountainous terrain, tunnels and underground facilities to hide and protect them from a disarming conventional counterforce first strike. There is also evidence that North Korea is exploring both silo and submarine launch technologies, presumably to further increase survivability. Moreover, statements from North Korea’s leadership and policy documents convey a strategy of “dealing deadly retaliatory blows at the strongholds of aggression.”¹³

Pronouncements out of Pyongyang suggest, however, that North Korea could have its sights on even more ambitious plans with a role for nuclear weapons that would be in line with a war-fighting strategy. It would not be the first country to do that. Countries like the United States, Russia and Pakistan have all embarked at one time or another on a strategy to threaten rapid nuclear escalation in response to real or perceived conventional weakness. However, North Korea would face significant operational, technical and economic challenges as well as escalatory risks in adopting such a strategy. Whether it could ever overcome those obstacles is unclear.

Alternative Nuclear Strategies

While Pyongyang’s emerging nuclear strategy may incorporate elements specific to its own unique circumstances, other small nuclear powers have essentially adopted one of four alternative strategies. The first is typically aimed at non-military goals, such as political, diplomatic or economic objectives. A second approach, called a “catalytic strategy,” is designed to internationalize regional conflicts by threatening nuclear war to compel one or more great powers to intervene during crises, restrain adversaries and restore stability. The third approach is an assured strategic retaliation strategy, which is aimed at deterring high-end, regime-threatening attacks and coercion. The final and most robust nuclear strategy is a war-fighting

¹³ “Law on Consolidating Position of Nuclear Weapons State,” *KCNA*, April 1, 2013.

strategy intended to offset conventional inferiority by threatening to use nuclear weapons first on the proverbial battlefield rather than relying solely on blunt threats against strategic targets.¹⁴ The four strategies are distinct from one another, differentiated by each one's primary objective, minimum requirement for execution—in terms of relative transparency, arsenal size and diversity, and operational or command and control (C2) complexity—and the major challenge specific to each strategy.

Political/Diplomatic: While many people might assume that states pursue nuclear weapons for military or deterrence purposes, not everyone agrees. On-again, off-again negotiations over North Korea's nuclear and missile programs over two decades suggest that its leaders have long used its nuclear program to extract food aid, energy assistance and other material concessions from the international community as well as to gain diplomatic bargaining leverage.

A nuclear strategy that is first and foremost concerned with extracting political, economic or diplomatic concessions has the lowest barrier to entry of the strategies under consideration because the development of weapons capability is unnecessary. This strategy only requires the technical elements of a nuclear weapons program that can then be traded for concessions from countries that do not want to see a nuclear-armed adversary. It might be advanced by demonstrating select capabilities for bargaining purposes at different times but does not *ex ante* require transparency. Rather, opacity itself can be traded incrementally for concessions. Since there is no weapons requirement and, thus, no arsenal, there are few demands in terms of operational complexity or command and control. The major problem for such a strategy, however, is a diminishing margin of return on investments, since the international community is likely to become weary of unending concessions.

Catalytic: A more ambitious nuclear strategy is designed to exploit the specter of nuclear war to draw in one or more great powers during crises to restore stability. This “catalytic” strategy is thought to have been adopted by South Africa, Israel and Pakistan at different times.¹⁵ It requires a higher level of transparency than one that is primarily aimed at political or diplomatic goals because a third party must believe that nuclear war is technically credible. In the case of North Korea, this strategy would require Pyongyang to demonstrate that it could cross the nuclear threshold and raise the regional if not global costs of a potential conflict. Such a strategy could be adopted with only a few crude weapons on standby to create the impression that war could escalate. As such, the arsenal does not require much by way of operational sophistication. The main shortcoming of this strategy is that it is essentially a gamble on third-party intentions as well as the adversary's calculation that a third party will intervene to impose restraint and restore stability.

¹⁴ Narang offers three nuclear strategies in *Nuclear Strategy in the Modern Era*: catalytic, assured strategic retaliation and asymmetric escalation. The framework offered here is expanded to include a strategy aimed at political or diplomatic goals and an important substitution of “war-fighting” for “asymmetric escalation” to convey the potential for intended compellence as well as deterrence effects. That is to say, “battlefield” nuclear weapons could be used to defeat, not merely deter, superior conventional forces.

¹⁵ Avner Cohen and McNamee, “Why Do States Want Nuclear Weapons?” *The Cases of Israel and South Africa* (Oslo: Norwegian Institute for Defence Studies, 2005). Also see Narang, *Nuclear Strategy in the Modern Era*.

Assured Strategic Retaliation: This strategy is aimed at deterring regime-threatening attacks and coercion. It depends foremost on developing survivable second-strike nuclear forces that can credibly hold at risk an adversary's strategic targets and impose unacceptable costs. China is widely believed to have relied largely on this type of strategy for at least three decades.¹⁶ A higher level of transparency is required to fully implement this strategy because the aim is to persuade an adversary that you can endure and retaliate against a first strike, though many aspects can remain ambiguous or hidden. For instance, China has long demonstrated the technical capability to strike high-value strategic targets (cities), but it has kept hidden operational details such as command and control, arsenal size and deployment patterns. Opacity here is thought to be part of China's effort to increase the survivability of its relatively limited arsenal.

This strategy calls for a larger arsenal than what is minimally necessary in the first two strategies because some redundancy is needed to ensure that enough weapons survive a first strike to threaten an adversary with unacceptable costs, whether that involves one, two or a dozen targets. The arsenal can be comprised solely of countervalue weapons since it does not need to hold at risk operational or tactical targets. It also requires a higher level of operational sophistication, since procedures for launching attacks would be in place to protect against disarming or decapitating strikes. Warheads and delivery systems do not necessarily need to be mated and ready for employment, but measures would need to be taken to guarantee the possibility of retaliation, such as dispersing, hiding or hardening weapons systems to withstand an attack and be operational in the aftermath—no easy feat. These measures would need to be exercised and tested to build confidence, while the resiliency and operationality of survivable forces would need to be telegraphed to adversaries to enhance deterrence. But command and control could still be highly centralized, at least during peacetime, with authority over weapons systems solely in the hands of the highest levels of political leadership.

The main problem with this strategy is a credibility gap for deterring lower levels of war against conventionally superior, nuclear-armed adversaries. In other words, a threat to destroy an adversary's cities in response to lower levels of aggression might seem incredible, especially when carrying out that threat would very likely result in a nuclear response. If the nuclear threat lacks credibility, a conventionally superior adversary might not be deterred from exploiting its advantage. North Korea, of course, faces a conventionally superior US-ROK alliance that is ultimately backed by US nuclear weapons. It might believe that a strategic retaliatory deterrent is necessary but insufficient for achieving its political-military goals against much stronger foes.

War-fighting Strategy: This strategy is designed to deter regime-threatening attacks as well as to offset conventional inferiority by threatening first use of nuclear weapons on the proverbial battlefield in the event of conflict. It perhaps requires a more robust survivable second-strike capability than assured retaliation because it must deter strategic-level attacks even in the fog of a nuclear exchange. But the distinguishing characteristic is the addition of so-called tactical weapons that can be used against opposing forces rather than relying on blunt retaliatory threats against major strategic centers. As such, a war-fighting strategy suggests an expanded role for

¹⁶ M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." *International Security* 35, no. 2 (Fall 2010), 48–87.

nuclear weapons beyond deterrence. Since “battlefield” nuclear weapons could be used to defeat as well as deter superior conventional forces, this strategy is better suited than assured retaliation for achieving compellence effects.

This strategy is thought to require a relatively high level of transparency for deterrence purposes. To be credible under this strategy, North Korea would need to demonstrate not only a survivable second-strike capability but also the capability and will to use nuclear weapons first. The will to use nuclear weapons first is often thought to be more difficult to convey than capability because the potential consequences of crossing the nuclear threshold are so great. To overcome this credibility gap, countries in the past have forward deployed nuclear weapons to battlefield lines. Whether or not launch authority is ever delegated to lower echelons of political and military command on the front lines, the idea is to persuade the adversary that some automaticity is built into the system, rather than leaving it to rational calculations or deliberate decision making. Commanders in charge of tactical nuclear units confronting defeat would face a “use it or lose it” choice. While transparency might be necessary for deterrence purposes, military effectiveness might rely on surprise. Countries adopting a war-fighting strategy would likely attempt to balance those requirements with varying degrees of transparency and ambiguity.

To adopt this strategy, North Korea would need to demonstrate multiple technical capabilities, including complex deployment and command and control arrangements. To address varying conventional conflict scenarios, the size of the arsenal would likely be much larger and more diverse, including counterforce capabilities such as smaller-yield and higher-accuracy weapons to deal with military targets in theater or on the battlefield. The major shortcoming of this strategy is that maintaining a large, diverse arsenal with a complex operating system can be exponentially expensive. This strategy can also create significant pressures during crises that can lead to unintended escalation or loss of command and control.¹⁷

¹⁷ Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton: Princeton University Press, 1993).

The four alternative nuclear strategies are summarized in the table below.

Table 1. Alternative DPRK Nuclear Strategies At A Glance: Minimum Requirements for Four Models.

ALTERNATIVE DPRK NUCLEAR STRATEGIES AT A GLANCE: MINIMUM REQUIREMENTS FOR FOUR MODELS					
Nuclear Model	Primary Goal	Relative Transparency	Relative Arsenal Size/Diversity	Operational Complexity	Problems
Political/Diplomatic	Extortion/blackmail/bargaining	Lowest -Demonstrate technical elements of a weapons program	None	None	Diminishing margin of return on investments
Catalytic	Internationalize a conflict and “catalyze” third-party assistance or intervention	Low -Demonstrate technical means for weapons but not necessarily operational capability	Small -Handful of crude weapons on standby	Low -Central authority -Weapons do not need to be assembled	Relies on adversary calculations about third-party intentions
Assured Strategic Retaliation	Deter regime-threatening attacks and coercion	Medium -Demonstrate survivable second-strike capabilities	Medium -Enough counter-value weapons to threaten unacceptable retaliatory costs	Medium -Central or delegated authority -Weapons may or may not be assembled -Prepared for crisis operations	Credibility gap against conventional threats
War-fighting Strategy	Deter or defeat a broad range of threats, including conventional attacks	High -Demonstrate survivable second-strike and first-strike capabilities/will	High -Large, diverse arsenal (counter force and counter value) for first use in a range of scenarios with reserve of second-strike forces	High -Prepared for pre-delegation and rapid deployment during crises -Planning integrated into military doctrine -High-alert status	Expensive and significant pressure on command and control that could lead to inadvertent escalation

North Korea’s Evolving Nuclear Strategy

North Korea’s behavior at times exhibits elements from all four strategies, and the one it adopts in the future may in fact be a hybrid. One reading of the limited evidence, however, suggests that its nuclear strategy has evolved over three decades and is on an ambitious and dangerous path. In the past, North Korea may have valued political and diplomatic goals above others. As one prominent North Korea expert writes: “on balance, this goal [diplomatic blackmail] seems to be even more important than using the nukes as a strategic deterrent.”¹⁸ Between 1994 and 2007, for instance, North Korea froze or disabled elements of its nuclear program in exchange for energy assistance, food aid, diplomatic talks, security assurances, sanctions relief and economic concessions. Some of those agreements, such as the 1994 US-North Korea Agreed Framework, significantly—if temporarily—constrained North Korea’s ability to expand its nuclear capability. Since then, on-again, off-again negotiations and agreements have been reached, but they have generally been short-lived and none have produced a sustainable path toward denuclearization. Over time, the international community has grown weary of unending negotiations; presumably speaking for the Obama administration in 2009, Robert M. Gates, the defense secretary at the time, said, “I’m tired of buying the same horse twice.”¹⁹

¹⁸ Andrei Lankov, *The Real North Korea: Life and Politics in the Failed Stalinist Utopia* (New York: Oxford University Press, 2013), 149. In a recent conversation, however, he clarified that the primary motive for North Korea has shifted over time from military to diplomatic and back to military.

¹⁹ David E. Sanger, “US Weighs Intercepting North Korean Shipments,” *New York Times*, June 7, 2009.

To the extent that North Korea's nuclear decisions were primarily motivated by political, diplomatic or economic goals in the past, those days appear to be gone for the foreseeable future. Over the past few years, North Korea has emphatically claimed that its nuclear program is not a bargaining chip. It has further stated that it is "unimaginable" to expect Pyongyang to rejoin the Nuclear Non-Proliferation Treaty as a "nonnuclear state." Reporting on a March 2013 plenary meeting of the Central Committee of the Workers' Party of Korea (WPK), the Korean Central News Agency (KCNA), the state news agency of North Korea, stated that "nuclear weapons of Songun Korea are not goods for getting US dollars and they are neither a political bargaining chip nor a thing for economic dealings ... [but are] the nation's life [and treasure] which can never be abandoned."²⁰

North Korea's nuclear capabilities remained unproven and far from transparent throughout the 1990s and most of the 2000s while it engaged in negotiations with the United States and others and received serious concessions for elements of its program. Without much of an arsenal, there was no need to develop sophisticated command and control capabilities during that time. The Nuclear Chemical Defense Bureau, an organ of the Ministry of People's Armed Forces that reports directly to the supreme leader, was thought by some to have been responsible for managing the nuclear inventory.²¹ As late as 2009, however, the International Crisis Group (ICG) assessed that the weapons still had not been transferred to the Korean People's Army. Rather, the ICG believed that the supreme leader closely guarded them through an independent yet still unidentified institution.²²

It is possible that North Korea's nuclear strategy may have shifted toward a catalytic model shortly after its first nuclear test in 2006 with the threat of nuclear war becoming a more routine feature during crises on the peninsula. North Korea has made a number of over-the-top threats that appear to be more about grabbing headlines and international attention than conveying serious military warnings. By threatening to escalate crises to nuclear war, North Korea may seek to stimulate Chinese, US and even Russian intervention to restrain South Korea and restore stability in large part because the prospect of a wider, nuclear war with regional consequences that could even draw the major powers in on opposite sides would be extremely costly for all concerned countries. After the 2010 North Korean artillery barrage on Yeonpyeong, for instance, Gates writes in his memoir that he and US President Barack Obama, Secretary of State Hillary Clinton and Chairman of the Joint Chiefs Mike Mullen all called their South Korean counterparts to effectively talk them down from "disproportionate" retaliation because "we were worried the exchanges could escalate dangerously."²³

At the same time, North Korea's nuclear program has become more transparent since 2006 through tests, military parades, media releases and public statements. It has demonstrated the technical elements of a weapons capability—the testing of three nuclear devices and a series of missile tests—even though questions remain about just how capable it is. Some analysts assess that North Korea could deliver a handful of nuclear warheads on short- to medium-range

²⁰ "Report on Plenary Meeting of WPK Central Committee," KCNA, March 31, 2013.

²¹ Andrew Scobell and John M. Sanford, *North Korea's Military Threat: Pyongyang's Conventional Forces, Weapons of Mass Destruction, and Ballistic Missiles* (Carlisle, PA: Strategic Studies Institute, 2012).

²² International Crisis Group, "North Korea's Nuclear and Missile Programs," *Asia Report no. 168*, June 18, 2009: 3.

²³ Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 407.

missiles, albeit with low levels of accuracy and confidence.²⁴ While others have been skeptical about Pyongyang's actual capabilities and particularly its rhetorical threats of preemptive strikes against the United States, all of these developments have reinforced the perception that the North has the capability to use nuclear weapons if it chooses.

Leaders in Pyongyang have also recently signaled their intent to provide greater political and bureaucratic weight to nuclear operations and presumably establish a command and control system, with continued emphasis on centralized authority. In March 2012, for instance, North Korea upgraded the Missile Guidance Bureau in charge of short- and long-range missile developments to the status of Strategic Rocket Forces Command, which is somewhat autonomous from the Korean People's Army and reports directly to Kim Jong Un and the army's General Staff. Its commander was also elected to the WPK Central Military Commission, chaired by the supreme leader. Some North Korea watchers believe this new Command is now the home for North Korea's nuclear forces.²⁵

Recent developments suggest that a catalytic strategy would be unreliable for North Korea over time. It may be that Chinese patience is wearing thin with Pyongyang's behavior, making Beijing less willing to intervene on the North's behalf.²⁶ Moreover, the North is likely to strive to lessen its reliance on such a strategy given its past up-and-down relations with China. Also, the 2013 US-ROK Tailored Deterrence Strategy and Combined Counter-Provocation Plan were reportedly developed in part to neutralize North Korea's nuclear leverage.²⁷ Additionally, South Korea has developed what some call a "proactive deterrence" posture, which reportedly promises to "take prompt, focused, and disproportionate retaliatory (and perhaps even preemptive) actions in order to raise the costs to North Korea of small-scale attacks" presumably before others can intervene.²⁸ As a result, it would be a real gamble for Pyongyang to rely on outsiders to restrain South Korea in any future crisis.

North Korea appears to have higher ambitions for its nuclear program that would allow it to move beyond a catalytic strategy to an assured retaliation doctrine. Pyongyang is thought to now have the infrastructure to more rapidly expand its stockpile of fissile material over the coming years. It is pursuing more capable, longer-range missiles that will sooner or later put targets in South Korea, Japan and the United States within reach. Moreover, those delivery systems are being designed with survivability in mind. The Nodong, Musudan and KN-08 as well as some of its short-range missiles are reported to be mobile and, therefore, can exploit North Korea's mountainous terrain, tunnels and underground facilities to hide and protect them from a disarming first strike. There is also evidence that the North is exploring both silo and submarine launch technologies, presumably also to increase survivability.

²⁴ David Albright, "North Korean Miniaturization," *38 North*, February 13, 2013, <http://38north.org/2013/02/albright021313/>.

²⁵ National Institute for Defense Studies, *East Asia Strategic Review* (Tokyo 2013), 146.

²⁶ Jane Perlez, "Chinese Annoyance with North Korea Bubbles to the Surface," *New York Times*, December 20, 2014, http://www.nytimes.com/2014/12/21/world/asia/chinese-annoyance-with-north-korea-bubbles-to-the-surface.html?_r=0.

²⁷ Karen Parrish, "U.S., South Korea Announce 'Tailored Deterrence' Strategy," *American Forces Press Service*, October 2, 2013, <http://www.defense.gov/News/NewsArticle.aspx?ID=120896>.

²⁸ Abraham M. Denmark, "Proactive Deterrence: The Challenge of Escalation Control on the Korean Peninsula," Korea Economic Institute: Academic Paper Series, December 2011, http://keia.org/sites/default/files/publications/proactive_deterrence_paper.pdf.

Pyongyang has similarly adopted a declaratory policy that reflects the essence of such a strategy. In 2013, for instance, the Supreme People's Assembly (SPA) promulgated the Law on Consolidating Position of Nuclear Weapons State, which many experts believe codifies official North Korean nuclear policy and strategy. It states:

[Nuclear weapons] serve the purpose of deterring and repelling the aggression and attack of the enemy against the DPRK and *dealing deadly retaliatory blows at the strongholds of aggression...*²⁹

Kim Jong Un expounded on the strategic rationale in a speech before the SPA Law was issued, when he stated:

When one is firmly equipped with the capability to make precision strikes with nuclear weapons against aggressors and strongholds of aggression, no matter where they are on the face of the earth, no aggressor can dare to attack recklessly, and the greater and more powerful the nuclear strike capability, the greater the power of deterring aggression will be. Especially in case of our country, whose opponent is the United States ... it is necessary to firmly bolster the nuclear armed forces both quantitatively and qualitatively.³⁰

As for operational planning, the SPA Law makes clear that launch authority remains highly centralized for the time being, when it states that “nuclear weapons of the DPRK can be used only by a final order of the Supreme Commander of the Korean People's Army...”³¹

While North Korea's investments and recent statements suggest that it may be building an assured retaliation strategy, there are signs that Pyongyang may have set its sights on a war-fighting strategy. Indeed, the SPA Law envisions an expanded arsenal and role for nuclear weapons in the future that goes beyond deterring high-end attacks to also deter and repel lower levels of aggression:

The DPRK shall take practical steps to bolster up the nuclear deterrence and nuclear retaliatory strike power both in quality and quantity to cope with the gravity of the escalating danger of the hostile forces' aggression and attack.³²

Similarly, Kim Jong Un's 2013 *byungjin* (parallel development of nuclear weapons and the economy) policy appears to suggest that nuclear weapons would, in the future, augment if not supplement the North's conventional forces, leading to the need for a more robust and diversified arsenal with new roles.³³ Moreover, some experts believe that North Korea has in place much

²⁹ “Law on Consolidating Position of Nuclear Weapons State” (emphasis added), *KCNA*, April 1, 2013.

³⁰ Kim Jong Un at the March 31, 2013, plenary meeting of the Central Committee of the Workers' Party of Korea, *Korean Central Broadcasting Station* (in Korean) April 1, 2013, http://www.ncnk.org/resources/news-items/kim-jong-uns-speeches-and-public-statements-1/KJU_CentralCommittee_KWP.pdf.

³¹ “Law on Consolidating Position of Nuclear Weapons State.”

³² *Ibid.*, emphasis added.

³³ For one South Korean perspective, see Cheon Seong-Whun, “The Kim Jong-un Regime's “Byungjin” (Parallel Development) Policy of Economy and Nuclear Weapons and the ‘April 1st Nuclearization Law,’” Korean Institute for National Unification Online Series, CO 13-11, April 23, 2013, [http://www.kinu.or.kr/upload/neoboard/DATA01/co13-11\(E\).pdf](http://www.kinu.or.kr/upload/neoboard/DATA01/co13-11(E).pdf).

of the infrastructure and investments to grow its arsenal to field a range of weapons for both countervalue and counterforce targets in order to address different conventional conflict scenarios while also bolstering a strategic deterrent.³⁴

One potential hurdle facing the North is that a war-fighting strategy would require a sophisticated command and control system that would likely entail a high-alert status, some pre-delegated authority and integration of nuclear forces into its broader military doctrine. Indeed, the WPK Central Committee released a report one day before the SPA Law was adopted, recommending that the military begin such planning:

The People's Army should perfect the war method and operation in the direction of raising the pivotal role of the nuclear armed forces in all aspects concerning the war deterrence and the war strategy, and the nuclear armed forces should always round off the combat posture.³⁵

Building and integrating a robust nuclear arsenal into a broader military doctrine for a war-fighting strategy, however, would be expensive, technologically difficult and risky. North Korean leaders have a finite amount of resources—money, people, supplies—and are faced with perennial challenges such as the current drought that could test the new leadership's policies. Building and maintaining multiple weapons systems, not to mention the additional training and exercising necessary to integrate them into a broader military doctrine, would be costly. Technologically speaking, North Korea would presumably want to develop multiple warhead designs for different delivery systems and targets, potentially including miniaturization for artillery or short-range rockets as well as solid- rather than liquid-fueled missile systems for faster launch times. To bolster strategic deterrence for a war-fighting strategy, Pyongyang also might find it necessary to build and test a viable reentry vehicle for its medium- and long-range ballistic missiles as well as higher-yield weapons to demonstrate that it can pose unacceptable costs with even a few weapons on target.

Lastly, adopting a war-fighting strategy would come with significant risks. Putting nuclear weapons in the hands of lower-echelon political and military authority seems to contradict the peculiar hierarchical nature of the political-military system in North Korea. For a regime that might be concerned about internal rivals or maintaining a tight grip on the levers of power, relinquishing authoritative control over weapons that it calls “the nation's life” and “a national treasure” could expose internal vulnerabilities. Of course, there would also be external risks. For instance, as North Korea ramped up its nuclear capabilities there would likely be international political and economic consequences as well as increased military tensions, since the United States and South Korea would be expected to respond with their own heightened defenses. Adopting a war-fighting strategy with nuclear weapons on high alert and in the hands of lower levels of authority could also lead to unintended escalation during crises and even the loss of command and control. North Korea may be willing to accept these costs and risks, but it is unclear whether it can ever overcome the inherent obstacles of this strategy, even if it aspires to develop such capabilities.

³⁴ Albright, *Future Directions in the DPRK's Nuclear Weapons Program*.

³⁵ “Report on Plenary Meeting of WPK Central Committee,” March 31, 2013.

The table below summarizes the evolution of North Korean nuclear strategy.

Table 2. North Korea's Evolving Nuclear Strategy?

NORTH KOREA'S EVOLVING NUCLEAR STRATEGY?				
Nuclear Model	Past	Present	Emerging	Over the Horizon Ambitions
Political/Diplomatic	Trade elements of unproven program for concessions - 1994 Agreed Framework - Six Party Talks - Fuel and Food Aid (Yongbyon)			
Catalytic		Demonstrated technical means but still ambiguous operations capability; over-the-top threats during crises to "catalyze" US and Chinese intermediation		
Assured Strategic Retaliation			Developing survivable strike capabilities targeting ROK, Japanese and US cities	
War-fighting Strategy				Parallel Development Policy of Economy and Nuclear Weapons and the April 1 Law on Consolidating Position of Nuclear Weapons State

Increasing transparency, size and diversity of arsenal, operational complexity

What's Next for North Korea?

If Pyongyang follows the trajectory sketched above, we would likely see North Korea, in the words of Kim Jong Un:

“increase the production of precision and miniaturized nuclear weapons and the means of their delivery and ceaselessly develop nuclear weapons technology to actively develop more powerful and advanced nuclear weapons.”³⁶

Doing so would provide some telltale signs, such as testing delivery systems and increasingly sophisticated weapon designs. Depending on how fast it would want to grow its arsenal for either an assured strategic retaliation or war-fighting strategy, North Korea could expand its fissile material production capacity. We might also increasingly see nuclear operations as part of routine military exercises as well as investments in command and control technologies and practices as the North integrates nuclear weapons into its broader military doctrine.

The first indicator that would suggest North Korea is determined to rapidly grow its arsenal for either an assured strategic retaliation or war-fighting strategy is the increased production of fissile material. David Albright offers three estimates of North Korea's nuclear arsenal in 2020 based on different fissile material production scenarios.³⁷ The low-end, medium and high-end estimates project roughly 20, 50 and 100 weapons worth of fissile material, respectively.³⁸ Albright takes

³⁶ Kim Jong Un at the March 31, 2013, plenary meeting of the Central Committee of the Workers' Party of Korea, Korean Central Broadcasting Station (in Korean) April 1, 2013, http://www.ncnk.org/resources/news-items/kim-jong-uns-speeches-and-public-statements-1/KJU_CentralCommittee_KWP.pdf.

³⁷ Albright, *Future Directions in the DPRK's Nuclear Weapons Program*.

³⁸ For the sake of comparison, the upper bound of those projections would put North Korea in the range of recently estimated stockpiles in Pakistan (120), India (110) and Israel (80). Hans M. Kristensen and Robert S. Norris, “Global nuclear weapons inventories, 1945–2013,” *Bulletin of the Atomic Scientists* vol. 69, no. 5, 2013: 75–81.

a number of factors into consideration in his estimates. Some presumably would be observable, such as the operationality and burn rates for weapons-grade plutonium at the 5 MWe Reactor at North Korea's Yongbyon Nuclear Scientific Research Center as well as at an experimental light-water reactor that is under construction but could be operational in the 2015–2016 timeframe. Other factors might be less obvious, such as the number and quality of North Korean centrifuges for producing weapons-grade uranium.

The second indicator would stem from efforts to develop “more powerful and advanced nuclear weapons,” as Kim Jong Un has vowed to do. Some have speculated for years that North Korea may be pursuing boosted fission or thermonuclear designs. Such sophisticated weapons would probably need to be tested for surety purposes, but it would not necessarily require many tests.³⁹ For instance, China tested a boosted weapon with only its third test and a thermonuclear design in its seventh test, while Pakistan claims to have included a boosted fission weapon in its first round of tests in 1998. Aside from building confidence, there are good deterrence reasons for testing higher-yield weapons. North Korea would presumably want to demonstrate to the United States and South Korea that it can pose unacceptable costs, even with only a few weapons. This is especially true for a war-fighting strategy, which requires that deterrence holds at the strategic level even after limited nuclear use.

North Korea might also conduct additional nuclear tests as it looks to produce miniaturized warheads for a range of weapons systems. As mentioned, some believe that Pyongyang might already be able to build a warhead for its Nodong missile that can hit regional targets, although with low confidence. Kim Jong Un, however, has identified the ability to strike the United States as a requirement for deterrence.⁴⁰ It may be logical that he would want to reinforce assured strategic retaliation by directly targeting the US homeland, but doing so presumably would be even more important for a war-fighting strategy. A war-fighting strategy also would likely lead North Korea to develop designs that are small enough for so-called tactical weapons, such as short-range rockets or artillery. Building reliable warheads that balance different yield-to-weight ratios for different weapon systems that are intended for targets ranging in distance from tens to thousands of miles away would not be easy without testing.

A third set of indicators would result from North Korean efforts to increase the range, accuracy and reliability of its delivery systems. Improvements in range would allow North Korea to strike US targets in Guam, Okinawa, Hawaii or the mainland, while increased accuracy would allow it to hit a broader set of targets besides cities and large military bases, and improved reliability would bolster confidence as well as deterrence. John Schilling and Henry Kan argue that ground and flight tests would be critical here, especially if the North seeks to upgrade its systems with

³⁹ Jeffrey Lewis, “Can North Korea Build the H-Bomb?,” *38 North*, June 11, 2010, <http://38north.org/2010/06/can-north-korea-build-the-h-bomb/>.

⁴⁰ North Korean efforts to restart plutonium production could also be a potential indicator that it is pursuing miniaturization, since many experts believe that plutonium is better suited than uranium for missile delivery by providing better yield-to-weight ratios. See Siegfried S. Hecker, “North Korea reactor restart sets back denuclearization,” *Bulletin of the Atomic Scientists*, October 17, 2013, <http://thebulletin.org/north-korea-reactor-restart-sets-back-denuclearization>.

high-performance engines and advanced reentry vehicles that would improve both reliability and accuracy.⁴¹ They also suggest that such tests would likely require limited infrastructure, such as downrange ships able to monitor flight data.

Efforts to improve survivability would lead to a fourth set of indicators. As mentioned, North Korea has invested in delivery systems with survivability in mind. It has focused primarily on mobility to exploit terrain, tunnels and underground facilities that hide and protect missiles, but it could take additional measures. For instance, Pyongyang could build hardened silos, as some have speculated that it is doing near the Chinese border, reportedly to complicate US targeting and protect some of its nuclear forces from preemptive strikes.⁴² It could also deploy a sea-based deterrent. In fact, a recent “ejection test” of a submarine-launched ballistic missile implies North Korean interest in a seaborne nuclear capability.⁴³ Lastly, North Korea’s current arsenal of delivery systems is thought to be made up of liquid-fueled missiles with the exception of its short-range KN-02.⁴⁴ It could develop solid-fueled missiles to enable launch with a few minutes’ notice as well as off-road mobility.⁴⁵

The fifth and final set of indicators would flow from North Korean efforts to operationalize a more robust strategy. Details of such arrangements are usually closely guarded secrets, but there might be generic signs of a growing nuclear force and its integration into North Korea’s broader military doctrine. For instance, we might see the expansion of training and certification of nuclear-specific personnel, the placement of communications technologies designed to survive nuclear strikes, or warning and assessment systems. Moreover, operational exercises would likely be increasingly important as the nuclear mission in North Korea grows. Assured retaliation requires measures such as dispersing or hiding weapons to withstand a first attack and making sure they can be operational in the aftermath. Given the complexity of such operations, Pyongyang would presumably want to exercise against different scenarios on a regular basis to build confidence as well as to send deterrence signals. Of course, should North Korea adopt a war-fighting strategy, we might see combined nuclear and conventional military exercises increase in regularity to prepare both leaders and soldiers for fighting in a nuclear environment.

⁴¹ Schilling and Kan, *The Future of North Korean Nuclear Delivery Systems*.

⁴² “North digs silos for missiles in Mt. Paektu area: Government sources say nearness to China is strategic advantage,” *Korea JoongAng Daily*, October 10, 2013, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2978649>. A search of the literature, however, does not provide reliable evidence, such as satellite images, of these reported silos.

⁴³ Joseph S. Bermudez Jr., “Underwater Test-fire of Korean-style Powerful Strategic Submarine Ballistic Missile,” *38 North*, May 13, 2015, <http://38north.org/2015/05/jbermudez051315/>.

⁴⁴ John Schilling, “An Assessment of the North Korean KN-08 ICBM (if it really exists),” *Arms Control Wonk*, May 6, 2012, <http://lewis.armscontrolwonk.com/files/2013/01/Schilling-KN-08-Assessment-small.pdf>.

⁴⁵ Schilling and Kan, *The Future of North Korean Nuclear Delivery Systems*.

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US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

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Van Jackson, Ph.D., is an associate professor at the Asia-Pacific Center for Security Studies and an adjunct senior fellow at the Center for a New American Security. He is the author of the forthcoming book *Rival Reputations: Coercion and Credibility in US-North Korea Relations* (Cambridge University Press). He previously served in the Office of the Secretary of Defense as director for Korea policy, working group chair of the US-Republic of Korea Extended Deterrence Policy Committee, and strategist and policy adviser for the Asia-Pacific. The views expressed are his own. For more information on his work, visit www.vanjackson.net.

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ALLIANCE MILITARY STRATEGY IN THE SHADOW OF NORTH KOREA'S NUCLEAR FUTURES

In the early decades of the Cold War when North Korea maintained only a large conventional force, alliance strategy depended on technological superiority. As North Korea gradually acquired cruise and short-range ballistic missile capabilities in addition to its conventional forces, the US nuclear umbrella and alliance missile defense capabilities took on greater salience. But as North Korea expands and improves its nuclear and missile delivery capability, the abstract promise of the US nuclear umbrella and missile defense may prove inadequate to prevent at least limited war scenarios.¹

This paper argues that North Korea's nuclear posture complicates alliance military strategy. At the strategic level, Pyongyang's nuclear posture is likely to emphasize assured retaliation, which becomes more credible as it increases delivery options and aggregate numbers of nuclear weapons. During a conflict, there is at least a moderate risk that regardless of North Korea's deliberate nuclear posture, it will shift to one of asymmetric escalation—launching nuclear first strikes to compel the US-ROK alliance to stand down or sue for peace. At the operational level, North Korean nuclear missiles strengthen anti-access concepts of operation (CONOPs) by using nuclear-armed missiles to target air bases and ports in South Korea and Japan. In this emerging strategic and operational environment, extreme military solutions—such as unification by military conquest alone—become even less plausible than they are today.

This strategic and operational trajectory affects the connection between US-ROK military operations and national strategy in a number of ways. First, to minimize operational vulnerabilities in an anti-access campaign, the alliance needs improved basing and port access in and around South Korea. This places a premium on Japan's involvement in any contingency. Second, consolidating the US military presence in Korea into two “enduring hubs” increases the size and reduces the number of targets at which North Korea could aim its nuclear weapons; US and ROK basing resilience is more likely with a geographically dispersed military basing structure. Third, US and ROK aircrafts need to be prepared to fly missions to and from many different bases—US bases, ROK bases and Japanese air bases as well. Fourth, all alliance operations need to be sensitive to the possibility of triggering a nuclear first strike from North Korea if the regime perceives its defeat is imminent or inevitable. Finally, the alliance needs to focus greater attention on limited war campaign scenarios, specifically campaigns with limited objectives that are tailored to avoid sending signals that regime change is inevitable.

¹ Van Jackson, “Across the Other Pond: Opportunities and Challenges in the Asia Pacific,” Testimony before the House Committee on Foreign Affairs, Subcommittee on Asia and the Pacific, February 26, 2015; Van Jackson, “From Political Taboo to Strategic Hedge: A US Perspective on Ballistic Missile Defense,” *The Asan Forum*, March 2015, <http://www.theasanforum.org/a-us-perspective-4/>.

This paper adopts as a point of departure the three nuclear and missile modernization scenarios proposed in *North Korea's Nuclear Futures: Technology and Strategy*.² Each nuclear and missile program scenario—minimal growth/modernization, moderate growth/modernization and maximum growth/modernization—makes different assumptions about how far North Korea might go, but even the minimal growth/modernization scenario makes North Korean anti-access operations and a wartime strategy of asymmetric escalation logical. The one part of my argument for which scenario trajectory matters is my claim that North Korea seeks an assured retaliation capability—a nuclear deterrent capable of surviving any alliance first strike. As explained below, North Korea's ability to actually adopt this strategy depends on the survivability of its nuclear arsenal, which in turn depends partly on how many nuclear weapons and delivery systems it develops.

Nuclear Strategy in War and Peace³

Vipin Narang suggests that states developing nuclear weapons typically choose from three types of strategies: 1) catalytic; 2) asymmetric escalation; and 3) assured retaliation.⁴ A catalytic strategy emphasizes the threat of nuclear weapons for the sake of bringing a patron closer to its nuclear weapon-wielding client. Asymmetric escalation relies on nuclear responses to conventional conflicts or crises as a way of compelling de-escalation or reaping political benefit. An assured retaliation strategy deploys nuclear weapons in a manner that ensures that the state's nuclear force can survive any first strike and launch nuclear second strikes in turn.

North Korea's rhetoric would have us believe it already employs an asymmetric escalation strategy, but its credibility is hampered by the reality that Pyongyang's nuclear and missile forces are insufficient to execute such a strategy as well as by its track record of dubious military posturing and threat making. Narang did not include North Korea as a case in his work on nuclear postures. However, in a separate analysis that focused on North Korea and Iran, he suggested that North Korea is most likely to choose a catalytic nuclear strategy designed to bring Beijing into a conflict on its side, assuming North Korea sees China as likely to do so.⁵

On the first count, there are several problems with assuming that North Korea employs or will employ an asymmetric strategy in peacetime. First, it would seem to subvert North Korea's widely acknowledged primary goal of regime survival. North Korea should want the outside world to believe it is willing to go nuclear first because it might accrue some political benefit through coercion. Perhaps, for instance, the alliance will hesitate to retaliate against a North Korean provocation in peacetime for fear of a conventional conflict escalating to the nuclear level. But should we believe it? For North Korea to actually adopt an asymmetric escalation posture in peacetime (as opposed to bluffing) would risk triggering regime change (the eventuality Pyongyang most ardently seeks to avoid) simply for coercive gain. Second, North Korea has a track record of hyping its military capabilities. Not only are there suggestions that

² Joel S. Wit and Sun Young Ahn, *North Korea's Nuclear Futures: Technology and Strategy* (Washington, DC: US-Korea Institute at SAIS, 2015).

³ Portions of this section originally appeared in Van Jackson, "What Is North Korea's Nuclear Strategy?" *The Diplomat*, May 28, 2015.

⁴ Narang's typology is incomplete, leaving out, among others, nuclear latency posture and a bargaining chip posture. For the purposes of military strategy, however, the three postures considered here cover the plausible range. See Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton: Princeton University Press, 2014).

⁵ Vipin Narang, "Nuclear Strategies of Emerging Nuclear Powers: North Korea and Iran," *The Washington Quarterly* 38, no. 1 (2015): 73–91.

its May 2015 submarine-launched ballistic missile (SLBM) test claim was exaggerated,⁶ but it has also staged missile capabilities in parades and on television to signal that it is capable of more than it actually is.⁷ Third, if North Korea were pursuing an asymmetric escalation posture, we should expect to see some evidence that Pyongyang is developing tactical nuclear weapons—nuclear-armed artillery, land mines, short-range rockets or “suitcase bombs.” Though nuclear-armed ballistic missiles typically serve the strategic purpose of existential deterrence and defense, tactical nuclear weapons are generally considered usable weapons. To date, there is no evidence suggesting North Korea is moving in this direction, though admittedly objective indicators and warnings are far from immediately obvious. Fourth, there is cause for skepticism about North Korea’s claims regarding its nuclear strategy, as well as about the deductions made by outside observers who rely on rhetoric to back their conclusions. For decades, Korea watchers have found it difficult to separate signal from noise when it comes to North Korean threat making, and its recent history of nuclear threats has unsurprisingly proven hollow.⁸

Narang’s argument that North Korean nuclear strategy would be primarily intended to catalyze Chinese intervention in a conflict on its behalf is also problematic. In the context of contemporary Sino-North Korean relations, a catalytic strategy ignores Pyongyang’s history of foreign policy independence from Beijing even as it has tried to extract resources from China;⁹ its *juche* ethos, which would be unlikely to allow it to pursue a deliberate strategy of dependence; and its distant contemporary relationship with China, which has grown increasingly strained since Kim Jong Un ascended to power.¹⁰ In other words, just because South Africa once pursued a catalytic nuclear strategy to induce US commitments—the empirical basis of Narang’s catalytic claim—it should not be assumed that North Korea would pursue the same strategy vis-à-vis China. The nature of the patron-client relationship between China and North Korea is simply too different; North Korea does not seek reliance on an outside power for its security.

*North Korea’s Assured Retaliation Strategy*¹¹

Although North Korea lacks sufficient capability for an assured retaliation nuclear posture today, there are several reasons to expect that Pyongyang is making a deliberate move toward such a strategy. First, assured retaliation, especially during peacetime, is the most stable of the various types of nuclear posture because it reserves nuclear use for second strikes while other posture types incentivize first strikes.¹² Second, North Korea has an incentive not to spark a war that would lead to regime change. An assured retaliation capability guarantees that regime change could not be forced from the outside without nuclear conflict. That, in turn, conditions US and South Korean decision makers to weigh the cost of nuclear attacks in pursuing regime change.

⁶ James Pearson, “North Korea Modified Submarine Missile Launch Photos, Says US Official,” Reuters, May 20, 2015.

⁷ Ibid.

⁸ Van Jackson, *Rival Reputations: Coercion and Credibility in US-North Korea Relations* (Cambridge: Cambridge University Press, forthcoming).

⁹ See, for example, Jackson, *Rival Reputations*.

¹⁰ Jane Perlez, “Chinese Annoyance With North Korea Bubbles to the Surface,” *New York Times*, December 20, 2014 http://www.nytimes.com/2014/12/21/world/asia/chinese-annoyance-with-north-korea-bubbles-to-the-surface.html?_r=0.

¹¹ Portions of this section appear in Van Jackson, “Why North Korea Wants Mutually Assured Destruction,” *The Diplomat*, June 4, 2015.

¹² It is, of course, possible to have an assured retaliation capability and be willing to launch nuclear first strikes. But as a strategy for achieving a political effect, that would equate to an asymmetric escalation strategy, only with a more secure and survivable foundation.

Third, and perhaps most importantly, while we lack “smoking gun” evidence about North Korea’s intentions, Pyongyang has made multiple observable decisions that we would associate with a state moving toward an assured retaliation strategy. Survivability of a nuclear force has several requirements, among them are geographically dispersed weapons locations, multiple types of nuclear delivery vehicles and a sufficiently large inventory of nuclear weapons. The most likely capability that assures nuclear survivability for North Korea is mobile missile launchers, which it has already developed. Generally, the capability that best assures nuclear survivability is a submarine-launched ballistic missile because of its mobility and difficulty of detection. All of these conditions fit with North Korea’s current trajectory. North Korea’s expected delivery vehicles for nuclear strikes include various types of ballistic missiles from multiple missile garrisons, KN-08 road-mobile transporter-erector launchers (TELs), the IL-28 bomber, Soviet-era submarines and surface ships. Its navy is making investments in SLBM technology and modernization of its submarine fleet—a highly expensive undertaking. And its nuclear facilities are not consolidated but spread across at least six locations around the country.¹³

While SLBMs may represent a “gold standard” for nuclear survivability, it may be possible to achieve that with ground-based mobile TELs as well. There is no consensus threshold in the nuclear literature for when survivability is achieved, and the nuclear-capable KN-08 may make North Korea’s nuclear force as survivable as SLBM systems. Even in a minimal growth/modernization scenario—which assumes no more than 20 nuclear weapons—North Korea may have a sufficient quantity of nuclear weapons to ensure survivability depending on the intended delivery vehicles.

Asymmetric Escalation Risks

While there are both logical and evidentiary reasons to believe that North Korea is pursuing an assured retaliation strategy to the extent its capabilities allow, there are also reasons to expect that North Korea might adopt an asymmetric escalation posture during periods of conflict. In the middle of a conflict, North Korea would have at least two types of incentives for being the first to use nuclear weapons.

One type of incentive is, as Keir Lieber and Daryl Press have argued, tantamount to “use or lose.”¹⁴ Nuclear weapon employment is completely rational in a mindset of fear-based desperation, interpreting US and South Korean political-military objectives as unswervingly to compel regime change in North Korea. This type of incentive for nuclear first use could derive from deliberate strategy prior to the outbreak of conflict, but would more likely be an adaptation to circumstances that arise in a conflict scenario. In the case of North Korea, the closed, non-pluralistic nature of the ruling Kim regime makes it unlikely that authority to launch nuclear weapons would be pre-delegated to subordinate military units; the ruling center cannot trust its functionary periphery with such power. Even if nuclear command, control and communications (C3) reside solely with Kim Jong Un, any alliance attacks that risk disrupting North Korea’s nuclear decision making also risk disrupting its survivability, making a “use or lose” situation even more likely.

¹³ Nuclear map of North Korea facilities, Nuclear Threat Initiative (NTI), http://www.nti.org/gmap/nuclear_north_korea.html?/.

¹⁴ Keir Lieber and Daryl Press, “The Next Korean War,” *Foreign Affairs online*, April 1, 2013; Keir Lieber and Daryl Press, “Coercive Nuclear Campaigns in the 21st Century: Understanding Adversary Incentives and Options for Nuclear Escalation,” Report for the Project for Advanced Systems and Concepts for Countering Weapons of Mass Destruction (Monterey, CA: Naval Postgraduate School, 2013).

Another type of incentive for nuclear first use during conflict is the operations, maintenance and logistics constraints North Korea would face during any sustained military campaign. The US Office of the Secretary of Defense's annual report on North Korean military capabilities and the threats they pose describes an increasingly feeble North Korean military.¹⁵ The problems of North Korea's aging equipment, much of which dates to the early decades of the Cold War, are compounded by budget-driven training and readiness reductions, as well as difficulties with weapons maintenance because of both cost and challenges with sourcing replacement parts while UN sanctions remain in place.

Rather than increasing readiness through training, many reports suggest parts of the Korean People's Army (KPA) are routinely diverted to agricultural, resource extraction and industrial—in other words, fundamentally economic—applications of their time and labor.¹⁶ Although elements of the KPA and North Korea's citizenry would be capable of fighting a localized, long-term insurgency within its own borders, it is difficult to see how North Korea's ability to sustain an actual war footing with the United States and South Korea—with a unified force and intact command-and-control network—would exceed a couple months at most. This lack of sustained operational capacity creates strong incentives to de-escalate or close a military campaign as quickly as possible. Desperation, in other words, may compel North Korea to launch nuclear first strikes, even with an assured retaliation capability.

The Korean Peninsula as an Anti-Access Environment

Whether assured retaliation or asymmetric escalation, each type of North Korean nuclear strategy leaves considerable room for how it is implemented. Because the CONOPs for any military campaign are likely to be planned and executed by the KPA, it, like all militaries, is likely to plan for military campaigns that achieve maximum effectiveness. Given the large and diverse inventory of missiles the KPA continues to refine and invest in, we might then expect that conventional and nuclear-tipped missiles will be relevant as a “force multiplier” in its operations.

Although anti-access operations are most often associated with China in US security discourses, most of Asia's militaries have been investing in capabilities and reorienting doctrine to emphasize blunting the power projection capabilities of others.¹⁷ North Korea seems to also be capitalizing on this trend, which has largely been enabled by the region-wide availability of precision-guided munitions.¹⁸ Several relatively inexpensive North Korean capabilities seem designed for anti-access CONOPs. Drones can be used as missile and long-range artillery decoys, or to divert alliance air defense resources in order to give North Korea's anemic air force a fighting chance at an offensive mission. Undersea mines, combined with anti-ship cruise missiles, can create significant barriers for US and ROK naval forces. Nodong missiles can be used to target air bases and ports in South Korea and Japan. And depending on its ability to steal, procure or simply reverse engineer Chinese missile capabilities, a North Korean anti-satellite

¹⁵ Office of the Secretary of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea: Annual Report to Congress* (Washington, DC: US Government Printing Office, 2014).

¹⁶ Terence Roehrig, “The Role and Influence of the North Korean Military,” in Kyung-Ae Park and Scott Snyder (eds.), *North Korea in Transition: Politics, Economy, and Society* (Lanham, MD: Rowman & Littlefield, 2012).

¹⁷ Van Jackson, “The Rise and Persistence of Strategic Hedging across Asia: A System-Level Analysis,” in Ashley Tellis, Abraham Denmark and Greg Chaffin (eds.), *Strategic Asia 2014–15: US Alliances and Partnerships at the Center of Global Power* (Seattle: National Bureau of Asian Research, 2014): 316–42.

¹⁸ Amy Chang, Ben FitzGerald, and Van Jackson, *Shades of Gray: Technology, Strategic Competition, and Stability in Maritime Asia* (Washington, DC: Center for a New American Security, 2015).

capability is not inconceivable; technology transfer, licit or illicit, has always given North Korea a lethal advantage. All of North Korea's modern capabilities and projected threats have roots in technology transfer: the KN-08 TELs from China;¹⁹ anti-ship cruise missiles modeled on the Russian Kh-35 Uran; the Nodong medium-range ballistic missile based on Scud technology; nuclear knowledge from Pakistan; drone technology from China's commercial sector; and cyber capabilities from China, which also occasionally serves as a location for launching North Korean cyberattacks.²⁰

North Korea's growing emphasis on missile diversification—even as its ground forces get diverted into non-military activities and the “air gap” between its air force and the South Korean air force expands—incentivizes the country to follow the military-technical trend in Asia favoring anti-access CONOPs. For decades, studies of the KPA suggested it would rely on special operations forces to try to infiltrate behind South Korean lines for the purposes of sabotaging alliance bases, ports and petroleum, oil and lubricant facilities prior to or at the beginning of any conflict.²¹ But the North's missile and rocket force can perform this task more assuredly, faster and potentially at less expense. Such attacks counter the local sources of alliance power projection in South Korea and Japan. If successful, they would delay or altogether prevent alliance and coalition partner force flow (including logistics and ammunition) from outside the Korean peninsula. Moreover, by targeting bases and ports, the KPA would remove locations for aircraft (and ship) recovery and maintenance.

A North Korean anti-access CONOP would prioritize conventional and nuclear missile use for four major purposes: delaying or preventing the large-scale flow of US and coalition partner forces into the broader Korean operating area (including United Nations Command rear area facilities in Japan); preventing surface ships from approaching close enough to North Korea's western and eastern coasts to launch amphibious assaults; eroding alliance air superiority by preventing recurring air sorties for both strikes and surveillance from air bases and aircraft carriers; and disrupting the logistics that support and sustain alliance ground forces that would move forward into North Korean territory. Using missiles to meet these operational objectives makes air bases, naval ports and surface ships critical target priorities. In essence, the US way of war requires projecting sustained power onto North Korea by multiple means; the North's missiles are best used to block or erode the alliance's ability to project power locally.

Adapting Alliance Military Strategy

The previous sections introduced several challenges to how the United States and South Korea might conduct combined operations in a military conflict with North Korea, yet certain military challenges would exist regardless of how North Korea's nuclear and missile program develops. Thousands of rounds of long-range artillery would still target Seoul from advantageous elevations and hardened locations. North Korea would likely retain a large number of special operations forces capable of guerrilla activities behind US and South Korean lines. US officials expect chemical weapons to be used early in a conflict.²² And North Korea would retain superior numbers of conventional ground forces. Moreover, North Korea's mountainous terrain and poor

¹⁹ Nick Hansen, “North Korea's New Long-Range Missile: Fact or Fiction?” *38 North*, May 4, 2012, <http://38north.org/2012/05/nhansen050412/>.

²⁰ Benjamin Haas, “China a Likely Factor in North Korea Cyber Prowess: Experts,” Agence France-Presse, December 26, 2014.

²¹ Joseph S. Bermudez Jr., *North Korean Special Forces* (London: Jane's Information Group, 1988).

²² “US Warns China of North Korean Chemical Weapons Threat,” Associated Press, September 10, 2013.

transportation infrastructure—there are very few functioning roadways outside Pyongyang—amplify its ability to deflect or seriously slow any invasion into its territory.

As described in the previous section, however, North Korea's nuclear and missile capability uniquely enables an anti-access approach designed to counter US and South Korean power projection. Adapting alliance military strategy to this changing operational reality draws attention to several priorities for alliance military posture and how it might approach a conflict with an anti-access oriented North Korea.

Some changes, well recognized by Combined Forces Command and US Forces Korea, are already being pursued. These include improved anti-submarine warfare capabilities, which are crucial against SLBMs and surprise attacks like those against the ROK naval ship *Cheonan* in 2010; enhanced intelligence, surveillance and reconnaissance assets and coverage to enable precision targeting of missile sites and launchers; and multilayered missile defense. Such improvements have been publicly affirmed in alliance Security Consultative Meetings dating back to at least 2010. The uncertainty about these capabilities simply centers on whether they can be improved and fielded quickly enough to meet the trajectory of North Korean missile developments. But other alliance changes that are not being undertaken—and are not necessarily even recognized today—should be considered as well. Discussed below are priorities for countering an anti-access, war-fighting CONOP, which emphasizes nuclear and conventional missiles.

Diversified Ports and Air Bases

To minimize operational vulnerabilities in an anti-access campaign, the alliance needs optimized basing and port accesses in and around South Korea to facilitate power projection. At present, there are seven naval ports in South Korea and only one US-designated naval base at Chinhae that coordinates ship visits but does not host any US naval assets. The South Korean navy has long aimed to establish a new navy base on Jeju Island, but progress has been slowed by a combination of domestic opposition and budget priorities favoring South Korean ground forces.²³ US air presence in South Korea is considerably greater than its naval presence, with two permanent air bases at Osan and Kunsan hosting 29 fighter squadrons. Additionally, the South Korean air force operates 11 bases in addition to aircraft at the two US-designated air bases.

It would be easy to recommend the construction of more landing strips for aircraft in South Korea, but the country's rocky topography does not allow for it. Similarly, much of South Korea's coast consists of shallow shoals of less than four meters in depth in some parts, making the construction of new naval ports impractical. Nevertheless, three policy decisions would improve the situation:

- First, the South Korean navy should expedite base construction on Jeju Island. Its rear area, offshore location is tactically useful, and the base would provide added diversification of locations where US, ROK and coalition partner ships could dock.
- Second, US air bases and ports located in Japan should offer capacity for not only US but also South Korean air and naval assets. There is a high risk that early in any conflict North Korean missiles would destroy at least some naval and air facilities—especially

²³ Andrew Yeo, "Back to the Future: Korean Anti-Base Resistance from Jeju Island to Pyeongtaek," *Asia-Pacific Journal* 9, issue 32, no. 3, August 2011.

the Osan and Kunsan air bases, and the port of Busan—even though alliance ships and aircraft might still be intact. Having more diversified facilities minimally requires utilizing United Nations Command–flagged rear area bases in Japan, yet South Korea has not grappled with this eventuality. While having more bases and ports would not make South Korea immune from attack, of course, it would further complicate North Korean targeting and improve alliance options.

- Third, deploying carrier strike groups takes considerable time, and given their city-sized presence, adversaries learn of their approach well before arrival. The United States should consider maintaining a continuous carrier presence in Northeast Asia in order to leverage additional mobile takeoff and landing locations. The presence of carrier strike groups in Northeast Asia now typically occurs only as part of military exercises, freedom of navigation assertions and show of force demonstrations as an occasional political signal of commitment or coercion. Because carrier strike groups consist of many naval assets in addition to the carrier,²⁴ which adds costs, the United States might explore the possibility of Japanese and South Korean ships partially constituting the non-carrier assets in the strike group.

Resilience through Dispersal

Another imperative in adapting military strategy to an anti-access CONOP is to effectively do the opposite of the current US-South Korea plan to consolidate the US military presence through the Yongsan Relocation Plan (YRP) and Land Partnership Program (LPP) initiatives. These initiatives, launched during the George W. Bush and Roh Moo-hyun administrations, are intended to shrink the US military footprint on the Korean peninsula, from approximately 104 US installations to 47, organized in two large, dense hubs—one in the Pyeongtaek area southwest of Seoul, and the other in the southern portion of the peninsula.²⁵ Whatever the original rationale, consolidating the US military presence in South Korea into two “enduring hubs” increases the size of and reduces the number of targets that North Korea needs to attack with nuclear weapons. North Korea does not even need to make major advances in precision-guidance to cause large-scale counterforce damage; it would merely need to aim in the general direction of two densely packed, wide-area targets.

Improving the resilience of the US presence on the peninsula in view of North Korea’s growing nuclear arsenal would be aided by a geographically dispersed military basing structure. Dispersal is one of only a limited number of ways to enhance the survivability of important forces and facilities that enable power projection, which is a crucial task in countering anti-access campaigns.²⁶ A major alternative to dispersal—hardening—might be possible if facilities were targeted by cruise missiles with small payloads, but hardening becomes nearly impossible against nuclear-armed missiles. YRP and LPP improve the political sustainability of the US military presence in South Korea by reducing US military real estate in Seoul—one of the most expensive real estate markets in the world—and by geographically concentrating areas where US military and South Korean civilians are likely to interact. That should reduce opportunities for political friction and military accidents that affect the host nation population. Thus, it would seem that

²⁴ In addition to any logistics and supply ships, carrier strike groups routinely include a cruiser, two destroyers or frigates, and submarines.

²⁵ R. Slade Walters, “US Forces Korea Transformation Update,” US Army Public Affairs, January 12, 2010.

²⁶ Sam J. Tangredi, *Anti-Access Warfare: Countering A2/AD Strategies* (Newport, RI: Naval Institute Press, 2013).

a decision to reverse YRP and LPP is an instance in which political and military strategy may contradict one another.

Readiness for Unpredictable Flight Patterns

Given the vulnerability of fixed bases to North Korean missile strikes, US and ROK aircraft need to be prepared to fly missions to and from many different bases—US bases, ROK bases and Japanese air bases as well. During combined military exercises, it would improve realism to direct US and South Korean aircraft not to take off and land from their assigned bases, but to treat all bases in South Korea and Japan as a single, large theater basing network, adapting where specific aircraft and squadrons physically end up based on assumptions about “suddenly” inoperable bases during exercises. This is much more difficult to do, in part because of logistical complications associated with maintenance and refueling support for specific types of aircraft, but it more closely replicates the circumstances alliance aircraft would face in a contingency.

Tailored Operations for Assurance Signaling

The traditional template for US war fighting, as Lieber and Press argue,²⁷ needs to be tailored to take into account inadvertent signaling about alliance objectives. Because the North Korean leadership fears decapitation, there is a high risk of it launching nuclear first strikes during a conflict if it believes the alliance intends to change the regime. If, as a conflict unfolds, the alliance decides it does not wish to compel regime change but rather aim for a more limited objective, all alliance operations need to be sensitive to the possibility of triggering a nuclear first strike from North Korea. This implies that large-scale amphibious assaults, destruction of North Korean air defense systems, and bombing runs against either Pyongyang or nuclear and missile sites need to either be avoided or conducted with a conscientiousness about messaging to North Korean leadership. Stealth aircraft have thus become especially valuable for precision targeting, as have special operations forces. Many types of ground force capabilities, such as counter-artillery fires, could also be employed without posing any kind of imminent risk to the North Korean regime.

Three critical rejoinders to this discussion are possible. First, one might point out that the alliance is likely to pursue regime change in any conflict scenario, so the issue of tailored operations and assurance signaling is moot. While it may be true that the alliance could seek regime change in a conflict, it makes eminent sense to use military feints that avoid conveying such a worst-case inevitability to North Korea; pursuing regime change would lead to the very nuclear escalation the alliance seeks to avoid. Second, there is also a possibility that North Korea will believe the alliance seeks regime change in any contingency; signaling limited scope intentions may not be possible. This might be true, but there is at least a possibility that it is not, and if there is an opportunity to avoid a total nuclear war, policymakers have an obligation to try. Third, some may question whether the alliance can fight and win a war under limited conditions in which the alliance exercises self-restraint. At present, the alliance probably cannot wage a limited conflict effectively, but the reason is not self-restraint—it is a lack of training and equipping for that possibility. Whether the alliance can “win” depends on how victory is defined. If victory amounts to regime change or the destruction of Pyongyang, then victory is almost impossible against a nuclear North Korea because either of these actions is likely to trigger nuclear conflict. If victory amounts to conflict de-escalation, avoidance of nuclear conflict and a restrained North Korean

²⁷ Lieber and Press, “Coercive Nuclear Campaigns in the 21st Century.”

foreign policy in the future, then victory is eminently possible, though it may demand a different way of thinking about and preparing for conflict than the way those are approached today.

Limited War—Fighting with What You've Got

Finally, related to the previous recommendation, the alliance needs to focus greater attention on limited war campaign scenarios. Specifically, the alliance should devise limited objectives tailored to avoid not only precipitating nuclear escalation, but also sending signals that regime change is inevitable. During the first North Korean nuclear crisis in 1993-94, the North Koreans told US diplomats that they had studied the US way of war during the 1990-91 Gulf War and that they were aware of how “flexible deterrent options” equated to massing large-scale US forces immediately outside the operating area before launching the invasion. The North Koreans claimed they would never allow this to happen and vowed to strike first if the United States started massing forces just outside the Korean theater of operations.²⁸

As part of exploring limited war scenarios and developing limited war contingency plans, two considerations become crucial to adapting alliance military strategy: ammunition stockpiles and the possibility of fighting North Korea without follow-on forces. Keeping up with the pace of a military campaign, as well as quickly shifting fortunes on the battlefield, may require immediate access to vast stores of ammunition. The Korean War is instructive of how much ammunition the United States and South Korea might need in a conflict. During a single battle in the Korean War, US and South Korean forces fired more than 300,000 artillery rounds in only seven days, illustrating how quickly forces can expend ammunition.²⁹ Ammunition superiority actually helped offset North Korea's superior numbers of conventional forces. Stockpiles are thus a tactical consideration that can generate strategic consequences.

Sufficient local ammunition stores are one variant of a larger theme for how to adapt alliance military strategy to an anti-access campaign: fighting without follow-on forces. If North Korea expects the United States to amass forces in staging areas just outside the Korean theater of operations prior to a conflict that decapitates the regime, then the US “way of war” risks triggering a North Korean nuclear first use. By only, or at least primarily, deploying within-theater forces—that is, those troops and weapons systems already on the peninsula or at bases in Japan—US decisions to destroy even sensitive targets, such as North Korean air defenses, are less likely to be perceived as a step toward regime change. This, in turn, suggests optimizing the composition of the US 28,500-troop commitment to South Korea to perhaps emphasize fewer ground forces (which South Korea can primarily provide) in favor of mobile air, naval and amphibious forces. It may further be unrealistic to expect that ballistic missile defense, such as the Terminal High Altitude Area Defense system, could be withheld and deployed only during a crisis.

Conclusion

North Korea is on a trajectory to have a larger, more lethal nuclear arsenal with time. There is some basis to assume that by 2020, North Korea will possess 20 to 100 nuclear weapons and that its diverse missile force will be capable of greater range and precision than today. This paper has argued that North Korea is already pursuing those measures necessary to secure an assured

²⁸ Jackson, *Rival Reputations*, ch. 6.

²⁹ James A. Houston, *Guns and Butter, Powder and Rice: US Army Logistics in the Korean War* (Cranbury, NJ: Susquehanna University Press, 1989): 160–62.

retaliation capability; in the meantime, the North will continue to bluff that it has an asymmetric escalation nuclear posture. Regardless of its deliberate posture, however, in the midst of conflict there is considerable risk that North Korea might resort to nuclear first strikes out of desperation. Even at the most modest levels of Pyongyang's predicted nuclear development, the alliance will be faced with a strategic dilemma, for there can be no forced regime change or unification without expecting North Korean nuclear use, whether as a first strike or retaliatory (because an alliance first strike could not fully disable North Korea's nuclear capability). Once conflict of any kind has started, nuclear use may occur because of inadvertent signaling.

In order to cope with these changing circumstances, I have argued that alliance strategy should take steps to expand and diversify bases and port accesses, conduct tailored operations to avoid inadvertent nuclear escalation, find ways to fight a limited conflict without out-of-theater force flow, and leverage Japan more than currently envisioned in any Korean contingency. There are many reasons, mostly political and fiscal, why these changes have not already taken place. Forward stationing an aircraft carrier in Northeast Asia would almost certainly be read as a threat by China, though so would most capabilities. Diffusing, rather than concentrating, the US military footprint on the peninsula unwinds a decade of work and expense associated with YRP and LPP, though sunk costs should not serve as a rationale for continuing any policy. Also, building a South Korean naval base on Jeju Island has already generated civil society opposition—a not uncommon reaction to any proposed military base construction.

There is, in other words, no shortage of explanations for why alliance strategy today is not optimized for fighting an anti-access, nuclear-capable North Korea. But if North Korea's nuclear and missile trajectory is permitted to reach even the most modest of levels projected, alliance strategy will be forced to adapt along the lines described in this paper, or risk one of two unpalatable options: North Korean nuclear use, or defeat in a limited war campaign.

US·KOREA INSTITUTE AT SAIS

US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

Nuclear North Korea: How Will It Behave?

ROBERT CARLIN
ROBERT JERVIS

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NORTH KOREA'S
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Robert Carlin is a Visiting Scholar at the Center for International Security and Cooperation at Stanford University, and served as chief of the Northeast Asia Division in the Bureau of Intelligence and Research, US Department of State from 1989-2002. During much of that period, he also served as Senior Policy Advisor to the Special Ambassador for talks with North Korea, and took part in all phases of US-DPRK negotiations from 1992-2000. From both in and out of government, he has been following North Korea since 1974 and has made over 30 trips there. He recently revised and updated Don Oberdorfer's classic contemporary history *The Two Koreas*.

Robert Jervis is the Adlai E. Stevenson Professor of International Politics and has been a member of the Columbia political science department since 1980. He has also held professorial appointments at the University of California at Los Angeles (1974-1980) and Harvard University (1968-1974). In 2000-2001, he served as President of the American Political Science Association. Professor Jervis is co-editor of the "Cornell Studies in Security Affairs," a series published by Cornell University Press, and a member of numerous editorial review boards for scholarly journals. His publications include *Perception and Misperception in International Politics*, *The Meaning of the Nuclear Revolution*, *System Effects: Complexity in Political and Social Life*, *American Foreign Policy in a New Era*, and *Why Intelligence Fails: Lessons from the Fall of the Shah and Iraqi WMD*, and several edited volumes and numerous articles in scholarly journals. He received his Ph.D. from California at Berkeley in 1968.

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NUCLEAR NORTH KOREA: HOW WILL IT BEHAVE?

Introduction

Much of the academic literature and, so it seems, policy thinking about proliferation makes the simple distinction between nuclear and non-nuclear states. Indeed, this distinction is enshrined in the Nuclear Non-proliferation Treaty (NPT). But, of course, it is clear that while there is a nuclear threshold, not all states that have crossed it are equal, and it is hardly counterintuitive to suggest that the quantity and quality of states' arsenals (and such vital accoutrements as reliability of delivery systems, warning systems, command and control arrangements, second-strike survivability, and final release authority) are likely to affect their behavior or the behavior of others toward them.

North Korea may already have 10 to 16 nuclear weapons and delivery systems, putting all of South Korea and much of Japan within range. It may have had something close to that capability since at least 2010. In that case, it is worthwhile to begin this paper by asking whether we have seen any changes since then in North Korea's posture or actions that may stem from having this arsenal.

At this point, the short answer is no. Apart from bolder rhetoric and more threatening propaganda, there has been very little in the way of unusual or enhanced aggressive action over the past five years. What have been labeled "provocations" consist almost entirely of North Korean test launches, possibly improving capabilities but by themselves posing no immediate threat nor necessitating a military response.¹ A nuclear test in 2013—the North's third, and widely considered its most successful to date—was an unwelcome development, but even that was not in itself a provocation or an act of aggression.

The one exception during this period is the Korean People's Army (KPA) shelling of a South Korean-held island in Korea's West Sea in November 2010. This might be seen as a risky probe to gauge the US-ROK response to a new situation in which the North possessed nuclear weapons. Given that North Korea quickly backed away in classic style from the confrontation it set off, however, it is difficult to attribute this highly unusual DPRK military action against the South solely or even in part to the possession of nuclear weapons. It seems more likely that it

¹ "Provocation" would seem to mean something one side has done to goad the other side to react—most likely even overreact. But in the North Korean context, this is not usually what is meant, but rather that the action is typical of a "rogue" state in that it is: a) beyond the scope of normal state behavior and a violation of norms and law; and/or b) doesn't seem to make a lot of sense to us because it does not appear to contribute to reaching the goals we attribute to them.

was connected with internal North Korean dynamics at the time, possibly a move by Kim Jong Un—at that point his father’s chosen successor—to prove himself tough and capable.

The DPRK’s nuclear arsenal will almost certainly grow over the next five years, and delivery capabilities are likely to improve. What concerns most observers is the possibility of increasingly reckless North Korean behavior—i.e., dangerous action as opposed to simply heightened rhetoric. The implicit assumption driving this concern seems to be that the North has been a coiled snake waiting for its opportunity to strike.

There are reasonable estimates that by 2020 the North could have anywhere from 20 to 100 nuclear weapons, almost certainly with short-range delivery systems, possibly with medium-range capability, and, in the worst case, with intercontinental capability.

- Low scenario—20 weapons (mostly short- and medium-range)
- Medium scenario—50 weapons (tactical and strategic)
- Large scenario—100 weapons (tactical and strategic, some intercontinental ballistic missiles and intermediate-range ballistic missiles)

It seems to us that none of these scenarios are likely to change North Korea’s strategic vision. The regime does not have regional ambitions, and possession of nuclear weapons in any number is unlikely to change that. Comparisons between North Korea and Hitler’s Germany in this respect have always been wide of the mark. The most likely scenario over the next five years, in our view, is for Pyongyang to remain tightly focused on its domestic situation, especially on its economy, and on ways to loosen or blunt the pressures from its neighbors and the United States.

That still leaves a core concern that the North could launch an effort to achieve the country’s reunification, similar to what it did in June 1950. Feeding such concerns is that under Kim Jong Un there has been a revival of long-dormant, provocative rhetoric about “the great revolutionary event of national reunification,” language that reinforces the widespread perception by outside observers that Kim is erratic if not irrational. Nevertheless, so far the preponderance of evidence is that the practical changes to the North’s approach to reunification that began in the 1980s, including a change in the definition of reunification to allow for the existence of two Korean governments, remain in place. Circumstances could unleash a decision (on either side) to lunge for solution of the unification question, and recent ROK statements making it clear that Seoul is aiming at a one-state solution may enhance concerns in Pyongyang that its back is closer to the wall in a crisis than it actually is. In that case, we could well enter the danger zone of North Korean fatalism, in which a decision to use nuclear weapons, especially against Japan—the historic enemy—would rise on the list of “patriotic” options. Similarly, if things go wrong (serious domestic disruption, grave economic downturn, pressing external threats to the regime), it will be time to worry that the leadership might become (as Koreans are wont to do) fatalistic and decide that death with “glory” is preferable to defeat.

Insights—or Arguments—from Other Cases

North Korea's behavior, of course, may be unusual, if not unique, but looking to theory and the history of nuclear deterrence to get questions, if not answers, is still worthwhile. Of course neither the theory nor the history, especially of the Cold War, is undisputed, and the relationship between the two is unclear. If the theory is valid, it presumably tracks with historical experience. But both have enough wiggle room to make such a comparison difficult. Furthermore, to the extent that the two converge, it is at least possible that theory has influenced history as well as been influenced by it. That is, most of the American work on deterrence is based on arguments pioneered by Thomas Schelling. But even if his theories describe much of American behavior in the last 30 years of the Cold War, it is possible that they do so because American leaders were influenced by Schelling's writings, directly in the case of John F. Kennedy (who read Schelling's memos) or indirectly in the case of Richard Nixon (who espoused what he called his "mad man theory," which is a crude name for Schelling's "rationality of irrationality").

Nevertheless, it is worth reminding ourselves of some of the basic claims made and questions raised by deterrence theory. Perhaps the most basic one is whether nuclear weapons can do more than protect the homeland. Put differently, how much of a shadow do nuclear weapons cast? Can nuclear weapons provide an umbrella over allies—what is called "extended deterrence"? If so, how is this possible? What conditions enable it, and what policies does it require? These questions were central to American policy in the Cold War, and it is at least arguable that the United States fought in Korea and Vietnam not because this was required by either their intrinsic importance or by the imperatives of domestic politics, but because it was believed that failing to do so would badly undercut the American threat to fight if the Soviet Union invaded Western Europe.

Another question was whether a forthright policy of deterrence actually made things worse by leading to unnecessary spirals of hostility and arms buildups. Much of this argument, which at first glance seems to be between two competing general theories, in fact turns on diagnosis of the adversary's motives and intentions—i.e., whether the other is driven primarily by a desire for security or whether it is willing to run significant risks to expand.² As we will see later, this question is relevant for how we might expect North Korea to behave as its nuclear arsenal increases.

Much of deterrence theory is built on game theory, at least in general terms. What is particularly interesting in the context of US-DRPK relations is that game theory assumes that both sides (and of course interactions involving North Korea involve more than two parties since the whole region is involved) share many expectations and beliefs about how the world works, or at least have a well-grounded understanding of how the other will respond. During the Cold War (and not only during that period) the United States believed its view was objectively correct, and at many points, most strikingly during the 1967 Glassboro Summit and during the first phases of the Strategic Arms Limitation Talks (SALT) negotiations, spent considerable effort to persuade the Soviet Union of the validity of American deterrence theory.

² Robert Jervis, *Perception and Misperception in International Politics* (Princeton: Princeton University Press, 1976), Chapter 3.

It is unclear, to say the least, whether North Korea and the United States understand deterrence in the same way. As is frequently the case, the North Koreans may understand more about US thinking than the other way around. DPRK propaganda generally makes it look as if North Koreans have a completely distorted sense of events, and no connection with what is considered a “normal” understanding of the world. Yet experience has shown that certainly at the working level in the party and at least some of the ministries, North Korean officials read and study much more than just the daily propaganda or the works of their leadership. They are expected to understand their field and, when applicable, the enemy’s thinking. In that case, it would be surprising if key working-level officials were not familiar with US deterrence theory. How far up the chain such understanding reaches is another matter. Figuring out ways to feed into internal discussions ideas that may not fit with the views of senior leadership is a constant problem in the North Korean system.

Basic Questions about North Korea’s Future Behavior

There are three key questions to consider in examining how Pyongyang might behave with a growing arsenal of nuclear weapons.

- Will possession of a larger arsenal of deliverable nuclear weapons change the North’s propensity to engage in behaviors that could trigger a confrontation?
- Will possession of a larger arsenal of deliverable nuclear weapons change the North’s behavior during a confrontation, whatever its origins?
- Will possession of such a capability cause the North to reexamine and change its overall strategy and goals, i.e., will deterrence theory as understood by the United States and others become central to Pyongyang’s thinking, or will it discard such concepts entirely for a new, dangerous, and essentially destabilizing approach?

Although there are points at which these issues overlap, in fact they are separate problems—the first having to do with a possible change in Pyongyang’s mindset, the second one with tactical decisions in the midst of an evolving confrontation, and the final one with strategic planning. What ties these questions together is that lurking underneath all of them are the bad dreams of nuclear planners: Will possession of a credible arsenal (say 20 or more weapons) lead to an adversary’s increased self-confidence? Overconfidence? Miscalculation?

As for the more tactical, behavioral issues, there is some limited evidence that countries behave more recklessly soon after they acquire nuclear weapons but after a while settle down to less obstreperous behavior.³ For example, shortly after the Soviet Union first tested a nuclear weapon in 1949, Stalin authorized Kim Il Sung to attack South Korea. For the Austrian scholar Michael Cohen, the crucial mechanism is learning from the first major crisis that such states face, often brought about by their initial overestimate of how much nuclear weapons can get them and how

³ Michael Horowitz, “The Spread of Nuclear Weapons and International Conflict: Does Experience Matter?” *Journal of Conflict Resolution* 53, no. 2, April 2009: 234–57; Michael Cohen, *The Psychology of Nuclear Crises: When Proliferation Causes Peace*, forthcoming.

easy nuclear crises will be to control. In this model, the fear generated by a confrontation is a sharp and powerful learning experience.

For Michael Horowitz, the mechanisms are more general and more gradual, and can include the accumulation of experience and internal thinking about the role of nuclear weapons. Neither of these investigations focuses directly on changes in the states' arsenals, however. Furthermore, both are subject to dispute (this is hardly surprising). Consider, for instance, Pakistan's dangerous adventure in challenging India in the Kargil region of Kashmir in 1999, which brought the countries to the brink of major war. Did that experience make Pakistan (or India) more cautious?⁴

It is also not clear how applicable Horowitz's observation is to North Korea. Over several decades the North has been through numerous sharp confrontations with the United States and in the process has seemingly perfected the art of carefully navigating these situations. In fact, the North's most sustained reckless phase (1966–70) was well before it possessed nuclear weapons and still believed itself highly vulnerable to a nuclear strike by the United States. The North's aggressive posture in those years was based on leadership decisions made in context of the Sino-Soviet split, the Chinese Cultural Revolution, and deepening US involvement in the Vietnam War. The best-known consequences were the Blue House raid and the USS *Pueblo* incident (1968), the EC-121 shootdown (1969), and numerous artillery battles along the military demarcation line throughout that period. These were highly destabilizing actions, and the fact that such provocative, overt risk taking was sustained over a period of several years made the situation extremely volatile. This sort of behavior on the part of Pyongyang has not been the norm, however, and in fact has been quite rare over the past 40 years.

Recently, as noted above, the only really “reckless” act in the past five years was the Yeonpyeong Island incident (November 2010), which was a direct, open and carefully planned attack on ROK soil. Going back further, there have been number of smaller confrontations (such as the August 1976 ax incident) or off-peninsula terrorist actions (as in Rangoon in October 1983 and Korean Air flight 858, November 1987), but it is difficult to see how possession of nuclear weapons would have significantly changed either the North's initial acts or its subsequent behavior in these episodes.

A number of North-South naval clashes in the West Sea have occurred (1999, 2002 and 2009) but these were, in effect, tactically bounded and, again, the first two of these clashes occurred without reference to possession of nuclear weapons. Similarly, the North's sinking of a South Korean naval vessel (March 2010) was carried out clandestinely and meant to be deniable. It had no larger strategic purpose and is probably best explained as an extension of the long-running inter-Korean dispute in the West Sea. As such, there is no reason to believe that possession of nuclear weapons had any bearing on the decision to undertake that operation. Similarly, the North's cyberattack on Sony Pictures in late 2014 would appear to have everything to do with the perceived need to take revenge against a movie that depicted the assassination of Kim Jong Un. The Sony hack was a function of the North's cyberwarfare capabilities rather than its nuclear arsenal.

⁴ For a good treatment, see Peter Lavoy, ed., *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict* (New York: Cambridge University Press, 2009).

The reason for this brief review of the clashes and confrontations over the past several decades is to make the point—one that many North Korea analysts accept—that the DPRK does not behave irrationally but rather with cold, meticulous calculation. In that regard, and to reiterate a key assertion, the North Koreans already have considerable experience dancing on the edge of crisis. Their longstanding practice is to take things only so far before stepping back. That approach was well illustrated in the most recent 2015 crisis, as an exchange of artillery fire and readiness levels increased dramatically on the front lines of both sides along the demilitarized zone. After the crisis, Kim Jong Un claimed that the North's possession of nuclear weapons is what helped bring the situation to a peaceful resolution, but in fact there was no reference at all to the nuclear arsenal during the crisis and no evidence that either Pyongyang or Seoul considered it in play.

The immediate question to ask, therefore, is not whether possession of nuclear weapons will intensify what has been labeled by many as reckless moves (perhaps not so reckless in the North's eyes since it has inevitably emerged from them relatively unscathed), but will it cause Pyongyang to recalculate where the margins are, and thus entice the leadership to imagine it can afford to resist more firmly or push harder against a US or ROK response. In other words, will the North believe that a larger arsenal provides a nuclear shield that will enable it to act more boldly because its adversaries will be deterred from responding strongly? During the Cold War, analysts talked about the “stability-instability paradox” whereby a mutual second-strike capability was posited to permit the state with local conventional advantages to act with impunity. Needless to say, this argument was rejected by many experts and indeed was a major fault line dividing the schools of thought about American nuclear posture in the 1970s and 1980s. It will probably be a similar source of contention in discussions about the Korean situation.

Perhaps the most likely next confrontation between the two Koreas will take place between their navies in the West Sea. Such a clash could conceivably escalate into something more serious, up to and including North Korean threats to use nuclear weapons if the ROK were to launch retaliatory strikes at targets on the North Korean mainland. However, the long history of the North's behavior in confrontations suggests that a break in the normal pattern is unlikely except in the most unusual (and so far, untraveled) circumstances. It is important to bear in mind that the devastation and casualties the North suffered during the Korean War are still part of the country's collective memory, and while there is always the danger of leadership miscalculation, we doubt the specter of another decade or more of emerging from the rubble of war will be easily dismissed, even by a young leader who himself has experienced none of that.

It is hard to imagine North Korea's leaders using nuclear weapons unless they felt that the regime itself was in grave danger of being ousted, most obviously by a conventional war being waged by the United States and South Korea. This highlights a point that was made by Schelling more than 50 years ago but that too often has been lost sight of: that deterrence and the broader policy of coercion can work only if threats are paired with credible promises to refrain from taking particular actions if the other side complies. Much theory and most policy discussion focus on making threats credible, but in the event of fighting on the Korean peninsula it would be vital for the United States to convince the North that it was not seeking regime change. How to make such a promise credible is a very great challenge, to say the least, especially given that

both Seoul and Washington in recent years have made little attempt to hide the idea that regime change would, indeed, be their goal.

A separate but still major concern is whether possession of a sizable arsenal of nuclear weapons might change North Korea's overall goals, and if so, how. Perhaps that question needs to be refined—how might possession of nuclear weapons change its goals/posture/approach not overall but in particular ways toward particular countries?

Pyongyang's estimates of what the traffic can bear—and what it might accomplish—has historically differed depending on the target. One can imagine that such a differential calculus would remain true and that Pyongyang would judge that it had more ability to maneuver with Japan or even the ROK once it has a larger nuclear arsenal even while still seeking to avoid a direct confrontation with the United States. In other words, Pyongyang could adopt a tougher posture vis-à-vis Seoul and Tokyo, believing that the US nuclear umbrella had become less credible in those capitals, and thus the psychological space for North Korean threats to be effective had expanded. On the one hand, the North may decide against pushing too hard for fear that it might drive Japan into going nuclear. On the other hand, Pyongyang might also calculate that signs of Japan going nuclear would put tremendous strains on the US-Japan alliance and would cause China to stiffen even more its posture against Tokyo. The North could also calculate that a nuclear-armed Japan would raise a considerable outcry in South Korea and might make the North's nuclear capabilities seem more like the “Korean” bomb it has been trying to portray.

Outsiders have never done a good job understanding the interplay among the domestic political, economic and security considerations in Pyongyang's calculations. From 1994 to 2001, the North froze its production facilities at Yongbyon, in effect putting a major component of the weapons program on hold, and even allowed the condition of those facilities to seriously deteriorate. Kim Jong Il, instead, concentrated on his central strategic goal—improving relations with the United States—and, beginning in 2000, on improving the economy. There is some evidence that Kim Jong Un may be as concerned with improving the economy as he is with achieving credible status as a nuclear weapons state, and that his strategy and calculations may be as focused as much on the former as the latter.

Effects of a Larger Arsenal

A larger arsenal with more types of delivery systems will inevitably lead to an expansion of perceived military options—not only (or even necessarily) for aggressive action but rather to defend in case of attack. Will that make the North more assured and thus less hostile? This equation never completely worked with the USSR, nor does it work with China today. Possession of an assured retaliatory capability does seem to provide time and space for more rational planning and decision making. Even so, there were a few close calls in the US-Soviet context, and in view of the extreme suspicion that fogs thinking in both Pyongyang and Washington about the other, misperception on the US side combined with imperfect command and control on the North Korean side could be a disastrous mix. It is worth noting that there were far fewer Soviet-American confrontations after the USSR attained secure second-strike capability than was true in the earlier period, although there are vigorous debates about whether this was a cause-and-effect relationship. We should also note that even a large arsenal does not automatically produce

a secure second-strike capability—the weapons have to be able to survive a first strike and to be accompanied by survivable delivery vehicles and command and control systems.

The North Koreans see themselves as small, weak and put upon. They may talk big, but that is largely a function of how embattled they perceive themselves to be. They are, as one ROK official who had long experience dealing with them said, poor but proud. They are also intensely pragmatic and non-ideological, certainly when it comes to foreign and security policies. They are not driven by a need to adhere to (or even to be seen as adhering to) ideological principles. None of the organizing principles of recent years—*juche* (self-reliance), *songun* (military first) or even Kimilsungism (the ideology and system of power propagated by Kim Il Sung, grandfather of the current leader)—is an overarching ideological system against which all action must be measured all the time. The dynamics of the North Korean system lead to many of the excesses that we see, but there is also an internal policy process—one we don't see but of which we have had more than glimpses over the years—that acts to keep foreign and security policy on relatively realistic and consistent footing.

It would be folly at this point to dismiss the possibility that possession of an arsenal of nuclear weapons could lead to a decisive break with the past or a roll of the dice on Pyongyang's part. But this paper is not an exercise in mind reading. We do not think it is beside the point to note that of the eight countries that have developed nuclear arsenals, none has so far decisively altered its fundamental calculations or stepped beyond the bounds of rational action. As noted, there is a long track record that suggests there are normal limits in North Korean actions and risk taking, and we do not believe there is any reason at this point to expect that North Korea would be the exception to the example set by other nuclear states.

So far, no country that has acquired nuclear weapons has become truly reckless. Nevertheless, possession of nuclear weapons has a deterrent effect and provides for an expanded list of options in situations that are perceived as threatening a state's core interests. The Soviet Union could move into Hungary and Czechoslovakia in part because it had some confidence that the United States would recognize the dangers of intervening. Having nuclear weapons did not change the imperative to deal with those developments, but it did give Moscow greater confidence that it was less likely to be risking a major American response. It is not too much to assume that when Pyongyang perceives its core national security interests are at risk, it will similarly move to protect them—not because it has nuclear weapons but because it can do so probably with a measure of greater confidence that any American response will be tempered.

Most countries that acquire nuclear weapons increase their forces fairly rapidly. A contrasting case is China, which until recently held to a small arsenal. This was contrary to what most experts expected. An interesting kind of counterfactual would be to imagine that China's arsenal had increased, but its behavior had remained the same and ask whether we would attribute any of China's behavior over the past 40 years or so to a growing arsenal. That is, because a state's nuclear posture is so salient to us, we may attribute its behavior to this even when other causes are at work. We cannot rule out that Pyongyang also has a Goldilocks number in mind for the right size of its nuclear arsenal. That number may be relatively small, i.e., well below the large, truly worst-case projections of 100 weapons by 2020. The ultimate size of the arsenal will help

shape the North's options and, presumably, signal something about Pyongyang's understanding of the utility of its nuclear force.

It is true that changes in both behavior and the stockpile could reflect national ambitions and power. That is, an obvious reason for a country to increase its arsenal is that it wants to throw its weight around. The implication of this is that limiting growth in arsenal sizes may be difficult without being able to make fundamental changes in the others' motives and capabilities. As Siegfried Hecker recently stated, "The more they [the North Koreans] believe they have a fully functional nuclear arsenal and deterrent, the more difficult it's going to be to walk them back from that."⁵

This does not tell us how North Korean behavior will change, but it is probably correct that an increasing stockpile both indicates a strong commitment to remain a nuclear power and builds bureaucratic and domestic interests that are likely to maintain a program, and indeed move it further to the forefront. In the extreme, of course, this observation is reflected in the argument that the only way to end North Korea's nuclear program is to change the regime, a view that looks more accurate the longer the North possesses nuclear weapons and the larger its arsenal grows. Whether or not this is a sensible goal is a separate question.

However, focusing too tightly on the size of the North's nuclear arsenal may be somewhat dangerous in its own right. The problem of mistaking capacity for intent is an old one and has reared its head in many places. For example, often overlooked is that the North has explicitly linked its nuclear weapons program to efforts at reviving the economy. That should raise questions about whether there is a subtle trade-off in the leadership's mind between the two goals—building a nuclear arsenal and enabling economic success. Our own concentration on the North's nuclear arsenal may cause us to imagine that Pyongyang is equally focused. The result could be that we might miss the possibility that the possession of nuclear weapons will not be the sole (or even the dominant) variable shaping Pyongyang's strategic decisions even after its arsenal grows. This problem with our misperceptions triggering a reaction we hope to avoid is unfortunately too common in dealings with North Korea. If we think the nuclear component has become the most dominant factor in the North's behavior and act to counter it, our actions may, in turn, spark a response from the North that we otherwise would not see. Mitigating against such a negative action-reaction spiral, the United States has considerable experience dealing with the psychological dangers arising in situations in which both parties are armed with nuclear weapons.

Even if we can associate growing nuclear capability with changes in behavior, the causation involved may be more complex. This probably matters more for academic analysis than for policy reasons. Still, it would be interesting (if very difficult) to try to separate changes stemming from internal impulses from those generated by the changed environment, especially changes in the behavior of others, including those stemming from their beliefs about the changes in the state's stockpile.

⁵ Quoted in Jeremy Page and Jay Solomon, "China Warns North Korean Nuclear Threat Is Rising," *Wall Street Journal*, April 23, 2015.

There is also the question of personal style. Kim Jong Un's style is quite different from his father's, though it is not yet clear (three and a half years into his reign) that this has translated into significant differences in North Korean behavior. Kim Jong Un is to some extent less subtle (or supple) in his reaction to perceived slights and challenges. If the ROK (or US) president says something Kim considers provocative or insulting, he makes sure to order a response in kind. He does not turn the other cheek, but so far it does not appear that he lets these episodes throw him completely off track.

It is also possible that in some cases an arsenal grows more or less by inertia or through bureaucratic desires (e.g., the cases of the United States and the Soviet Union in the 1960s and 1970s) and that despite the lack of strong international political motives, changes in behavior still follow. In other words, once an arsenal grows, decision makers find political uses for it. There is clearly no reason to rule out this dynamic in the case of North Korea, just as, at this point, there is no reason to rule out the possibility that Pyongyang already has in mind a Goldilocks number of weapons.

At minimum, the capacity to increase the arsenal could well lead to a form of bootstrapping in terms of requirements for target coverage that we saw in the US case. The demand for greater target coverage leads to building more weapons, but then at some point the arsenal grows even larger and eager military planners are quick to find new targets and kinds of targets that should be covered. This, in turn, leads to "requirements" for even more weapons. Whether this prompts changes in foreign policy behavior, however, is less clear.

These processes complicate our attempt to answer the question of what the increase in a state's arsenal tells us about its plans, motives and views of the world. For example, although most of us find the pace of Pakistan's nuclear weapons program alarming, it is hard to determine what this tells us about Pakistan and its political objectives. To turn this around, it is hard to infer how North Korean behavior will change from the fact that it is increasing its stockpile.

Indeed, it remains possible that Pyongyang's foreign policy will become more aggressive, or at least more assertive. Yet a larger and more secure arsenal can also increase the state's security and lead it to behave in a more restrained way. Weak powers sometimes behave most obstreperously when they feel weakest and most subject to external pressure, and Jervis has argued in the context of Soviet-American relations that if countries are driven by fear they may behave better when they have retaliatory forces that allow them to feel more secure.⁶

Spillover Onto Diplomacy

Thinking about North Korean behavior naturally gravitates to questions of when or whether the DPRK will decide to use nuclear weapons, either physically or as a means of coercion. We would add another possibility: that possession of a nuclear arsenal will, in more subtle ways, affect Pyongyang's approach to negotiations—both in deciding what should be on the table, and how it should be discussed. Given the North's view of its perilous place in the world, we doubt that the end result will be Pyongyang believing its nuclear arsenal gives it direct leverage to pry

⁶ Aleksandr Fursenko and Timothy Naftali, *Khrushchev's Cold War* (Norton, 2006); Jervis, *Perception and Misperception*, Chapter 3.

out solutions it would not otherwise achieve in talks. Rather, we think it more likely that the brittleness of what up to now has been the North Korean style and approach to talks—that is, highly defensive and reactive—will be replaced by something with more ballast, in other words, something along the lines of increased self-confidence that was previously noted as a by-product of having nuclear weapons.

So far there is little to examine to see what course this self-confidence might take in the diplomatic arena. Since February 2011, there has been essentially no real engagement with the North by either the US or South Korea. One could argue that Pyongyang's failure to engage is a function of newfound confidence and that now, with possession of nuclear weapons, it can afford to play hard to get. A careful look at the situation as it has evolved over the past four years supports such a conclusion. There is no doubt those in Pyongyang gladly use the time without negotiations to further develop the numbers, sophistication and delivery means for the nuclear arsenal. We cannot know if we are in a rapidly diminishing period of opportunity, when North Korean attachment to nuclear weapons is not yet set in stone, whatever its public posture.

In early 2013, the North suggested that the question of its nuclear weapons program was off the table. In June of that same year, however, it reversed itself and signaled that the nuclear question was up for discussion, though exactly what was meant by that remained to be seen. Since then, despite frequent reiteration of the propaganda line that nuclear weapons are not a bargaining chip, Pyongyang has kept the door open to discussions on the issue of its nuclear weapons.

The issue of international concerns about the state of human rights in North Korea provides an interesting case in point. Rather than being more threatening or even more obdurate, when the human rights issue blew up earlier this year, the DPRK position was to offer to talk about it and hint broadly at the possibility of concessions. Whether these were real or imagined is not the point, nor is the likelihood that these were tactical measures in hopes of diffusing the situation. The point is, possession of nuclear weapons did not alter normal patterns of DPRK diplomatic behavior.

Similarly, in January 2015, Pyongyang put an offer on the table that symbolically laid out terms of trade for steps potentially limiting its nuclear program. Specifically, Pyongyang offered to trade a temporary halt to US-ROK joint military exercises in return for a freeze on nuclear testing. Again, this position was not tougher or even more provocative. Quite the opposite, it was one that, at least on the surface, appeared to open the door to exploring ways to address the nuclear problem. A skeptic could argue that Pyongyang might consider its nuclear program still too vulnerable and is therefore working to keep the situation relatively calm while using the time to develop the capacities it has threatened it already has—smaller, better, more accurate weapons more easily delivered over longer ranges.

For now, even several years into its growing nuclear arsenal, there has not been anything North Korea has done that is markedly at variance with its traditional patterns of behavior. To date, nothing suggests we are edging into the red zone. There are still no clues as to how, or whether, the possession of nuclear weapons will alter North Korean diplomacy or security policy. If the North's behavior—either in the diplomatic arena or on the military front—is to change as a result of its nuclear arsenal, we have yet to see signs of what those changes will be.

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US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

The Future Impact of North Korea's Emerging Nuclear Deterrent on Nuclear Nonproliferation

LEONARD S. SPECTOR

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Leonard S. Spector is Executive Director of the Middlebury Institute of International Studies' James Martin Center for Nonproliferation Studies, leading the Center's Washington, DC office.

From 1997 to 2001, Mr. Spector served as Assistant Deputy Administrator for Arms Control and Nonproliferation at the US National Nuclear Security Administration (NNSA). His principal responsibilities included overseeing NNSA's nuclear export control activities and the development and implementation of arms control and nonproliferation policy with respect to international treaties.

Prior to his service at NNSA, Mr. Spector directed the Nuclear Nonproliferation Project at the Carnegie Endowment for International Peace, where he established the Program on Post-Soviet Nuclear Affairs at the Carnegie Moscow Center and organized one of the leading annual international conferences on nonproliferation issues. Earlier in his career, Mr. Spector served as Chief Counsel to the Senate Energy and Nonproliferation Subcommittee and as a Special Counsel at the US Nuclear Regulatory Commission.

Mr. Spector is the author or co-author of six books and numerous articles on nonproliferation and comments frequently on this subject in the media. His current research focuses on strategies to challenge proliferant states' continued possession and use of illicitly procured dual-use nuclear goods and implementation of the Joint Comprehensive Plan of Action limiting Iran's nuclear program, with particular attention to financial sanctions.

Mr. Spector's most recent work, co-authored with Egle Murauskaite, is *Combatting Nuclear Commodity Smuggling: A System of Systems* (Monterey, CA, and Washington, DC: James Martin Center for Nonproliferation Studies, 2014) and co-editing, with Matthew Bunn, Martin Malin and William Potter, *Countering Black Market Nuclear Technology Networks* (Cambridge University Press, forthcoming).

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THE FUTURE IMPACT OF NORTH KOREA'S EMERGING NUCLEAR DETERRENT ON NUCLEAR NONPROLIFERATION

The emergence of North Korea's nuclear deterrent has been a grievous blow to international nonproliferation efforts and poses serious national security challenges for the United States and its Northeast Asian allies. It is by no means clear, however, that the precedent North Korea has set will significantly erode the nonproliferation regime or stimulate proliferation elsewhere.

This paper will identify a number of arenas where North Korea's becoming a nuclear weapons possessor state might be expected to have significant negative consequences, and it will assess the damage likely to be done. As will be seen, the ripple effects of North Korea's crossing the nuclear threshold may be more limited than they first appear.¹

Erosion of the Global Nonproliferation Regime - I

Experts will differ regarding what to count as elements of the global nonproliferation regime, but for purposes here, it is useful to be inclusive because the fundamental point to be appreciated is that the combined impact of these very powerful tools failed to deflect Pyongyang's bid to acquire nuclear arms. An immediate concern is that this history may create a deeply troubling precedent that greatly encourages possible future entrants into the proliferation race.

A detailed analysis of the failure of each of the relevant elements of the nonproliferation regime is not needed here. But it is worth recalling what is on the list of measures that were brought to bear in this case and ultimately proven ineffectual. In rough order of international authority and breadth, the ultimately inadequate measures include:

- *Core international regime elements*, specifically the Nuclear Non-proliferation Treaty (NPT); the International Atomic Energy Agency (IAEA) safeguards system;

UN Security Council Resolution 1540, requiring all states to adopt controls over weapons of mass destruction (WMD) and related materials, including export controls; and UN Security Council Resolution 1718 and successors, imposing sanctions on North Korea.

¹ This paper was presented at a June 3–4, 2015 workshop conducted by the project on North Korea's Nuclear Futures. The author wishes to thank the participants at that event and its chair, Joel Wit, for their thoughtful comments on the paper and would also like to express appreciation to Joseph S. Bermudez for his additional suggestions after the workshop.

- *Associated multistate regime elements*, namely the Nuclear Suppliers Group, the Zangger Committee, the Proliferation Security Initiative and the Financial Action Task Force.
- *Widely adopted national measures to implement these various regime elements*, including export and financial controls.
- *Complementary elements* that borrow from broader, external diplomatic, economic, military and intelligence capabilities, including the Six Party Talks; ad hoc diplomatic interventions with China and other parties with influence over North Korea; unilateral and multistate economic sanctions, including isolation from the Western financial system; the threat of military intervention, at least at certain points along the way (such as 1993–1994); and the intensive application of intelligence resources.²

In addition, by repeatedly violating a de facto global moratorium on nuclear testing in 2006, 2009 and 2013, Pyongyang disregarded another important nonproliferation norm.

In effect, North Korea has appeared impervious to nonproliferation measures. This immunity, however, may well be unique. Pyongyang's isolation from global political discourse and the international financial system has made it difficult to craft measures that can create effective external pressures for nuclear restraint. The fact that the UN Security Council was forced to rely in part on embargoing luxury goods highlights how few levers have been available to pry North Korea away from its nuclear ambitions, and those available hardly appear commensurate with the task at hand.

Moreover, time and again, China has diluted efforts to pressure Pyongyang to alter its nuclear course. Not only has China not used its political and economic leverage to restrain North Korea, but it has repeatedly acted to weaken UN sanctions resolutions, made only halfhearted efforts to curb the leakage to North Korea of nuclear- and missile-related goods, and imposed only limited restrictions on North Korean use of Chinese banks for proliferation-sensitive transactions.

It is difficult to identify another potential proliferant state that fits this profile of isolation and steadfast support from a major-power patron. Thus, it is reasonable to anticipate that the nonproliferation regime writ large will continue as a powerful restraining influence on proliferation decisions elsewhere, largely mitigating the demonstration effect of Pyongyang's defiant withdrawal from the NPT; disregard of sanctions imposed by the Security Council, the United States and others; and apparent ease in acquiring high-tech components for its nuclear (and missile) programs.

In this context, the outcome of the ongoing negotiations between the P5+1 (China, France, Russia, the United Kingdom and the United States, plus Germany) and Iran over restraining Tehran's nuclear program takes on particular significance. If Iran, having been subjected to

² Because they are not directly germane to the evolution of North Korea's nuclear deterrent, the list does not include measures, such as the Convention on the Physical Protection of Nuclear Material (CPPNM), focused on securing nuclear materials against use by extremist non-state groups. North Korea has also successfully defied a range of nonproliferation measures to advance its missile program, further highlighting the failure of nonproliferation norms and institutions as restraints in this instance.

virtually the same panoply of nonproliferation pressures outlined above, accepts and implements negotiated limits on its nuclear activities—as it appeared ready to do as of October 2015—it may be possible to pronounce North Korea's nuclear defiance to be a non-contagious malady. If, however, the agreement to implement nuclear restraints collapses and Tehran disregards reimposed UN sanctions, expands its sensitive nuclear infrastructure, and edges ever closer to nuclear arms, the influence of Pyongyang's precedent will loom larger. Indeed, the effect of the two cases in combination would deal a compound setback to the credibility of the nonproliferation regime that would greatly exceed the impact of North Korea's defection standing alone.

Erosion of the Global Nonproliferation Regime - II

North Korea's development of a nuclear deterrent may also challenge the nonproliferation regime along a different vector. The norm underlying the nonproliferation regime, namely, the goal of halting the spread of these weapons, depends on a near-universal consensus of states around the globe. But that consensus, as forcefully underscored during the 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, depends, in part, on a grand bargain: Under Article VI of the treaty, in return for the renunciation of nuclear arms by non-nuclear weapon state parties, the “nuclear weapon state” parties (those that had detonated nuclear explosive devices prior to January 1, 1967—China, France, Russia, the United Kingdom and the United States) must make good-faith efforts toward similar renunciations.

The United States has sought to demonstrate its compliance with this stricture by highlighting its reduced reliance on nuclear weapons, as articulated in the 2010 US Nuclear Posture Review. It also points to the dramatic reductions in deployed US strategic nuclear systems and warheads, as well as the withdrawal of US tactical nuclear weapons from South Korea, its removal of sea-based tactical nuclear weapons (a part of past US deterrence forces protecting Japan and South Korea), and its subsequent retirement of sea-launched nuclear-armed cruise missiles (also a part of past US nuclear deterrence forces protecting those two countries), which had been held for some time in non-deployed reserve in the United States.

The advent of a growing North Korean nuclear arsenal, now estimated at 12 to 20 nuclear weapons, along with a sizable missile arsenal able to reach South Korea, Japan, and, before long, it seems, the United States, has reoriented US nuclear policy toward Pyongyang away from preventive nonproliferation in favor of containment and deterrence. In this context, the United States, to reassure its regional allies, has openly and repeatedly underscored for them the potency of US nuclear deterrent capabilities and US readiness to use these capabilities in defense of its Northeast Asian security partners.³

So far, neither Tokyo nor Seoul has publicly requested the return to the region of US tactical nuclear weapons, but at least one senior South Korean official has raised the possibility.⁴ (The

³ See, for example, “US Says It Sent B-2 Stealth Bombers over South Korea,” *CNN*, March 28, 2013; <http://www.cnn.com/2013/03/28/world/asia/korea-us-b2-flights/>; “US Shows Nuclear Facilities to Reassure Japan, Allies on Deterrence,” *Asahi Shimbun*, July 30, 2013, http://ajw.asahi.com/article/behind_news/politics/AJ201307300096.

⁴ “South Korea Considers Return of US Tactical Nuclear Weapons,” *The Guardian*, November 22, 2010, <http://www.theguardian.com/world/2010/nov/22/south-korea-us-tactical-weapons-nuclear>.

United States is making parallel efforts to reassure its NATO allies in Europe, where the United States is reported to deploy 160 to 200 nuclear bombs at six bases in Belgium, Germany, Italy, the Netherlands and Turkey.⁵)

Such increased, highly publicized US emphasis on nuclear deterrence, including at least the possibility of redeploying tactical nuclear weapons to Asia, could intensify already serious concerns among non-nuclear-weapon NPT parties about the slow rate of progress toward nuclear disarmament—and indeed could lead to embittered complaints that the trend in this direction may be reversing.⁶ How badly such dissension might weaken the treaty is not clear, but obviously such developments will not bolster the consensus on which the treaty depends.

Spur to Proliferation in Northeast Asia

To assess the impact of North Korea's development of a nuclear arsenal in creating pressures for Japan and South Korea to meet this challenge by developing comparable, countervailing armaments of their own, classic proliferation analysis calls for examining the predilections of the two countries' political and military leaders, existing and emerging technological capabilities, and more general factors, such as public attitudes and national cultures, including historical dimensions. The restraining influence of international nonproliferation norms and treaties and related diplomatic interventions by the United States and other governments must also be weighed, as well as the likelihood of a confrontational response to any steps toward nuclearization from a rising, nuclear-armed China—and from North Korea itself.

In the context of 2015, however, the factor most likely to dominate thinking in Tokyo and Seoul on how to manage the North Korean nuclear danger could well be timing. To put the matter succinctly, the two countries face an immediate and rapidly worsening threat from an aggressive, risk-taking and unpredictable North Korea. But with Japan lacking effective delivery systems and South Korea lacking fissile material, they cannot hope to meet this threat by means of indigenous nuclear deterrents for at least five years, and quite possibly longer.⁷ The only effective counter in these circumstances is reliance on the United States.⁸

⁵ Hans M. Kristensen, "Non-Strategic Nuclear Weapons," Federation of American Scientists, Special Report No. 3, Washington, D.C., May 2012, p. 16, http://www.fas.org/docs/Non_Strategic_Nuclear_Weapons.pdf.

⁶ These states have underscored their support for disarmament in a series of international meetings, the most recent attended by 158 countries, examining the humanitarian impacts of nuclear weapons, with some participants pressing for a new convention banning nuclear weapons outright.

⁷ Japan has a substantial and advanced space launch capability, with a number of systems that could be converted to intermediate- and longer-range, nuclear-capable missiles. Nonetheless, making such conversions; refining warhead designs, fusing and separation; manufacturing sufficient numbers to stock a deterrent arsenal; and developing mobile or silo basing systems would require considerable time. "Japan: Missile Program," Federation of American Scientists, <http://fas.org:8080/nuke/guide/japan/missile/index.html>.

⁸ Japanese Prime Minister Shinzo Abe recently acted to reinforce his country's links to Washington, gaining approval of Japan's lower house of parliament to authorizing the use of Japanese military forces abroad in cases when Japan is attacked, or when a close ally is attacked, and the result threatens Japan's survival and poses a clear danger to people. Jonathan Soble, "Japan Moves to Allow Military Combat for First Time in 70 Years," *New York Times*, July 16, 2015, <http://www.nytimes.com/2015/07/17/world/asia/japans-lower-house-passes-bills-giving-military-freer-hand-to-fight.html>.

The United States also confronts an acute timing challenge. In the Asian context, US national security depends on Japan and South Korea remaining stalwart allies in the effort to balance China and contain North Korea. Thus for Washington, the goal in reinforcing its alliance relationships is not merely to reduce proliferation pressures in Tokyo and Seoul, but, more importantly, ensuring that US allies not succumb to nuclear intimidation.

Thus, in a sense, the problem for Washington is not so much preventing proliferation on the part of its allies, but rather finding a more timely substitute for proliferation that will strengthen their strategic postures in a nuclear-fraught Northeast Asia. Fortunately from the US perspective, the situation creates a “virtuous circle”: the greater the reliance of its two Asian partners on this extended deterrence relationship, the more susceptible they become to US counter-proliferation pressures, as Taiwan and South Korea itself learned in the 1970s.

Multiple tools are available to strengthen US allies in Asia. Washington is pursuing many of these avenues, reaffirming its political commitment to defend its regional partners by transferring advanced conventional arms, enhancing regional and US-based missile defenses, and, in the nuclear realm, demonstrating US capabilities with the March 2013 overflight of South Korea by nuclear-capable B-2 bomber(s) and providing considerably more substantial strategic briefings and dialogues than in the past.⁹ Some options, such as reintroducing tactical nuclear weapons on US naval assets deployed in the region, are off the table, at least for the moment, because of continued US and Russian adherence to their pledges to withdraw such weapons under the 1991–1992 Presidential Nuclear Initiatives.¹⁰ Redeployment of US nuclear weapons to Guam, however, may be a practicable and, from the standpoint of Japan and South Korea, desirable measure, although the step would likely trigger heated denunciations from Pyongyang and Beijing.

Just as the impact of North Korea’s nuclear advances on the global nonproliferation regime will be greatly influenced by external factors, in particular, Iran’s future nuclear course, so the impact of North Korea’s nuclear advances on proliferation in the region will be greatly influenced by another external factor, in this case, Chinese behavior, in several areas. These include:

- If China persists in what can only be characterized as a *laissez-faire* policy toward North Korea’s expansion of its nuclear arsenal, including Beijing’s toleration of leakage to the DPRK of Chinese-origin and third-country nuclear- and missile-related goods, pressures for Japan and South Korea to respond will continue, including pressures, even if limited, for the development of independent nuclear deterrents. If China changes course and takes steps to constrain North Korea, such pressures would ease accordingly.
- China’s readiness to assist North Korea militarily in the event of a crisis with the United States and its allies is also a factor that Japan and South Korea must take into account. It

⁹ See, for example, US Department of State, Office of the Spokesperson, “US-Japan Extended Deterrence Dialogue June 10–12 [2014],” June 9, 2014, <http://www.state.gov/r/pa/prs/ps/2014/06/227303.htm>; Ministry of Foreign Affairs, Japan, Japan-US “Extended Deterrence Dialogue,” http://www.mofa.go.jp/press/release/press4e_000637.html.

¹⁰ “The Presidential Nuclear Initiatives (PNIs) on Tactical Nuclear Weapons at a Glance,” *Arms Control Today*, August 2012, <https://www.armscontrol.org/factsheets/pniglance>. If Russia were to renounce such restraints, however, this option would again be available to Washington.

is not clear whether Beijing has offered Pyongyang explicit security guarantees or that it would seek to deter the United States from the possible use of nuclear weapons against the North by threatening nuclear retaliation on behalf of its ally. The possibility of such action, of course, could cause Tokyo and Seoul to question the ultimate reliability of US extended deterrence. But it also underscores the impracticality of their developing indigenous nuclear deterrents, which in this scenario, would need to counter not only North Korea—with its many years' head start—but also the far more daunting nuclear threat from China.

Indeed, at least for some Japanese strategists, the threat from an increasingly assertive China has displaced that from North Korea as the preeminent national security concern. But, as just suggested, once China becomes a major factor in Japanese and South Korean nuclear decision making, the requirements for creating effective indigenous nuclear deterrents grow dramatically, as do the timelines for deploying them, making this option all the more impractical.

Even if under such a “rational actor” analysis, there is no obvious—and perhaps no possible—way for either Japan or South Korea to achieve a timely, credible nuclear deterrent against North Korea, much less against China, it would be wise for analysts to consider less “rational” factors that might propel Tokyo or Seoul toward nuclear armaments. Such factors—in particular, domestic politics and bureaucratic pressures—are clearly in play in both countries.

It does not take an expert to observe that national security hawks now lead the two US allies and within their factions, are champions of nuclear armament. In both states, moreover, nuclear energy establishments also wield considerable influence. In Japan, champions of nuclear energy pine to reopen the Rokkasho Mura reprocessing plant and eventually complete the nuclear fuel cycle, which would add to Japan's already sizable stocks of directly weapons-usable separated plutonium. And, in South Korea, nuclear energy devotees have pressed to engage in near-reprocessing—technically, “pyroprocessing”—a stepping-stone toward plutonium separation and, potentially, *de facto* nuclear-weapons status.

These influences suggest the United States may confront a mixed strategy in Japan and South Korea, stimulated most immediately by North Korea's nuclearization but also by the looming threat from China. Under this strategy, both of the US regional partners would rely crucially on US extended deterrence for years to come, but both would also be seen edging toward independent nuclear weapon and related capabilities. The actual goal of such hedging would be to shorten the timeline for acquiring independent deterrents, whether or not brought to fruition, and creating sufficient ambiguity about future intentions to keep North Korea and China off-balance.

Washington would presumably oppose such advances, at least in its public pronouncements. Nonetheless, some US policymakers might consider increased nuclear ambiguity on the part of Japan and South Korea to be advantageous in the context of the unfolding US confrontation with Pyongyang and Beijing. Although not a perfect parallel, US endorsement of India's use of a number of its nuclear power reactors to produce plutonium for weapons under the 2006 US-India nuclear deal might be seen as a precedent. This decision went against the grain of US nonproliferation policy, but it supported the underlying goal of the deal, which was to reinforce

US-Indian ties (and Indian military capabilities) as a means of balancing a rising China. The US agreement in 2012 to allow South Korea's development of new ballistic and cruise missiles with capabilities well above the Missile Technology Control Regime (MTCR) threshold of concern is another example of Washington's setting aside certain proliferation goals in order to enhance the military capabilities of a friend confronting a state that the United States also perceives as an adversary.¹¹

In sum, further proliferation in Northeast Asia because of North Korea's nuclear arsenal appears quite unlikely, but a certain ambiguity in Japanese and South Korean nuclear behavior may arise. Unfortunately, the absence of additional nuclear states in the region does little to reduce the risk of nuclear confrontations there that could create considerable dangers for the United States.

Spur to Proliferation Elsewhere

Predictions of nuclear developments in Northeast Asia are dominated by unavoidable practicalities, in particular, the near impossibility of states at risk responding in kind to the North Korean and Chinese nuclear threats on a timely basis. Assessing the impact of a nuclear North Korea farther afield, in contrast, requires a good deal more speculation because outcomes could vary dramatically depending on how specific developments unfold.

Iran. North Korea's impact on further proliferation in the Middle East will depend heavily on Iran's future implementation of the Joint Comprehensive Plan of Action (JCPOA), signed with the P5+1 in mid-July 2015. Three principal scenarios are relevant here.

- If Iran scrupulously implements the terms of the JCPOA, the agreement will significantly constrain its nuclear activities and greatly reduce the likelihood that it will acquire nuclear arms for at least a decade. In this case, the possible impact on Middle Eastern security affairs of North Korea's having become a nuclear armed state will likely be quite modest, with a possible exception, discussed below, regarding Syria. Iran would not develop nuclear arms. In addition, it would have access through a monitored channel to any goods it requires to pursue permitted nuclear activities and, thus, no need for clandestine nuclear supplies from North Korea.
- Under a second scenario, however, matters are not quite so rosy: Iran signs the agreement with the P5+1 but then cheats and seeks assistance from North Korea in one or more prohibited areas. To date, Iran and North Korea have collaborated on the development of short- and intermediate-range missiles, but they are not known to have collaborated on the production of nuclear weapons. In the near future under this scenario, however, Iranian cheating under the P5+1 agreement could include purchasing equipment from North Korea for a clandestine facility in Iran or possibly in another locale; purchases of substantial amounts of North Korean highly enriched uranium; collaboration with Pyongyang on advanced centrifuges; and/or gaining know-how from North Korea on warhead design and nuclear weapons production. Joint activities conducted in North Korea might be especially difficult for outsiders to observe. Missile collaboration might

¹¹ Simon Mundy and Michiyo Nakamoto, "US Eases South Korea Missile Restrictions," *Financial Times*, October 7, 2012, <http://www.ft.com/intl/cms/s/0/5211903e-1052-11e2-a5f7-00144feabdc0.html#axzz3bT8m5zAf>.

also continue, given Iran's presumed interest under this scenario in building a secret nuclear arsenal. Depending on the scale of collaboration, Iran's ability to "sneak out" from the P5+1 agreement could be greatly enhanced.

From the North Korea standpoint, there would be little to lose from such cooperation. Its nuclear arms protect it from military intervention; it is already politically and economically isolated and under heavy sanctions, so it is unlikely to suffer significantly from further punitive measures of this kind; and it will continue to enjoy a measure of protection from its patron—China has never punished Pyongyang for its many grave nuclear transgressions.

- If the P5+1 agreement with Iran unravels, Iran might openly pursue many of the collaborative efforts with the DPRK described in the cheating scenario, above. Presumably Iran would do so with alacrity in order to accelerate its dash to its first nuclear warheads and thereby reduce its window of vulnerability to outside military intervention; alternatively, it might prefer the clandestine option while continuing the pretense of pursuing solely peaceful activities.

As in the cheating scenario, the impact of North Korea's nuclear deterrent is to enable it to pursue such collaborations with impunity.

Saudi Arabia, Egypt and Turkey. If the JCPOA collapses, it has been suggested that several states in the greater Middle East region might be driven to seek nuclear weapons of their own. Saudi Arabia, Egypt and Turkey are most frequently mentioned in this context. Moreover, Saudi Arabia has hinted that even if the deal is fully implemented, it will develop a uranium enrichment capability, which would provide Riyadh with a latent nuclear weapons capability comparable to Tehran's. None of these states has close ties with Pyongyang, but in these circumstances, all might be looking for clandestine nuclear assistance of one type or another. Saudi Arabia would most likely turn to Pakistan, but Pakistan—or, at least, A.Q. Khan during the years when his network was in operation—has sometimes turned to North Korea to fulfill orders from third parties, as when Pyongyang provided Pakistani parties with uranium hexafluoride gas for Libya's late dictator Muammar Gaddafi.¹² Whether North Korea would decline to assist Saudi Arabia or the others in their nuclear endeavors out of loyalty to Iran is not easily predicted.¹³

Syria. From 2001 to 2007, North Korea secretly provided equipment to Syria for construction of a nuclear reactor designed for the production of plutonium and helped in the construction of the facility. The reactor was destroyed as it was approaching operational status by an Israeli airstrike in September 2007. Syria was building the facility in violation of its commitments under the NPT, under which it had pledged not to develop nuclear weapons.

¹² Mark Fitzpatrick, *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation* (London: International Institute of Strategic Studies, 2007), p. 78.

¹³ Stranger transactions than this can be found in the nuclear history books, such as China's reported supplying heavy water to India for its Dhruva plutonium production reactor whose output was to be used for nuclear weapons directed at China's regional ally, Pakistan—and at China itself. Gary Milhollin, "India's Nuclear Cover-Up," *Foreign Policy*, Fall 1986, pp. 161–75.

With Syria now embroiled in a violent civil war whose duration and outcome remain in doubt, it is difficult to imagine that it has restarted its bid to acquire nuclear arms. However, at least one story has surfaced that cites unnamed intelligence sources as claiming that Syria has, indeed, relaunched the program at a secret facility near the city of Qusayr.¹⁴ If Syria were to pursue this course, North Korea might again step in to assist it. When it did so in 2001 and risked international condemnation or worse, Pyongyang lacked nuclear weapons, but it went forward nonetheless. Presumably, now that it is nuclear armed, it would have still less compunction in providing such aid.

Separately, with the United States and other foreign powers intervening militarily in the Syrian conflict, Bashar al-Assad may observe that Kim Jong Un's possession of nuclear arms provides North Korea with virtual immunity against such intervention. Should Assad remain in power, this lesson could provide strong encouragement for him to resume his quest for nuclear arms.

Myanmar. There is ample evidence that North Korea provided Myanmar with conventional arms and missile technology, some in violation of a UN embargo on such exports.¹⁵ It has also been rumored that Pyongyang provided Yangon nuclear assistance of some sort, but the evidence has been challenged and the matter left unresolved. In recent years, however, in the wake of increasing democratization and some diminution of the authority of the country's military, whatever concerns may have existed regarding the country's nuclear ambitions appear to have eased, with the United States, for one, publicly indicating that its concerns on the subject have been allayed.¹⁶ In this setting, North Korea's nuclear capabilities do not appear to be a source of proliferation concern.

Diminishing market? In light of the above analysis, if the JCPOA is fully implemented and Iran is thus not in the market for possible nuclear assistance from North Korea, it will be hard to identify a state that is under pressure to proliferate and would turn to Pyongyang for such support. Indeed, the market for North Korean nuclear goods could shrink to innocuous levels.

Non-state actors. With the advent of the Islamic State (ISIS) in Syria and Iraq, the enlarged role of the al-Nusra Front and al-Qaeda in Syria, the Taliban in Afghanistan, Boko Haram in Nigeria, and the long-standing presence of Hezbollah in Lebanon, and Hamas in Gaza, the nature of militarized non-state actors has gradually changed. Rather than being networks of fragmented cells with no enduring geographic base, today's violent non-state actors control substantial swaths of territory and, in several instances, considerable financial resources. As events unfold, moreover, some are acquiring powerful weaponry—significant stocks of surface-to-surface missiles, in the case of Hezbollah and Hamas, and radioactive materials (from hospitals and industries in Mosul) and small quantities of poorly dispositioned chemical weapons, in the case of the Islamic State—that point toward possible future bids to acquire WMD capabilities.

¹⁴ Erich Follath, "Assad's Secret: Evidence Points to Syrian Push for Nuclear Weapons," *Spiegel Online International*, January 9, 2015, <http://www.spiegel.de/international/world/evidence-points-to-syria-still-working-on-a-nuclear-weapon-a-1012209.html>.

¹⁵ Jay Solomon, Yuka Hayashi, and Colum Murphy, "Korea's Illegal Weapons Pipeline Flows On," *Wall Street Journal*, November 29, 2012, <http://www.wsj.com/articles/SB10001424127887323830404578144981537771060>

¹⁶ See, "Myanmar Overview," Nuclear Threat Initiative, citing sources, <http://www.nti.org/country-profiles/myanmar/>.

While it is possible to imagine the acquisition by some of these groups of limited chemical, biological or radiological capabilities, it is more difficult to conceive of their pursuing nuclear weapons, much less succeeding. Construction and operation of the needed nuclear facilities is simply beyond the technical abilities of these groups, even if North Korea were to provide assistance, and none of these actors can count on maintaining a stable geographic base for such facilities that would endure for the decade or more needed for their construction and operation. Nor is it likely that North Korea might provide such complete nuclear weapons to them for fear of losing control over their use—and possibly being linked to a future detonation.¹⁷ This restraint, however, assumes that the North Korean government remains intact and operational.

Civil Unrest

The potential for proliferation involving North Korea's growing nuclear arsenal must also consider the dangers that this capability might pose in the event of regime collapse, whether as the result of rebellion or of military conflict with South Korea and the United States. Assuming a crisis of either type in which DPRK command authority becomes uncertain, control over the various components of North Korea's nuclear program might devolve along at least five basic paths:

- Nuclear custodians protect their assets until order is restored and turn them over to the country's new ruling authority.¹⁸
- A faction of North Korean nuclear insiders or outsiders seize the assets and hold them hostage either as bargaining chips in the unfolding tumult or for future sale.
- Anarchy reigns, and nuclear assets are partly destroyed and partly dispersed to unidentified warring elements.
- One or more outside powers (China, the United States or South Korea) intervene and gain control of the nuclear assets.
- Various combinations of the above.

One expert observer of the North Korean nuclear program believes that the first of these scenarios is the most likely, given that these custodians are thought to be the most highly trained, best equipped and most loyal of North Korea's forces. He has also noted that this group would be the most likely faction to maintain possession of North Korea's nuclear assets for possible use as bargaining chips.¹⁹

Adding further complexity is that multiple categories of nuclear assets, initially under the control of a number of different governmental entities and located at a number of sites, will be at issue as the crisis unfolds. Among categories of nuclear assets of concern are:

¹⁷ Whether Pyongyang might provide assistance to one or more of these groups for a conventional weapons program is a more realistic concern but beyond the scope of the discussion here.

¹⁸ This seemed to be the direction of events in Syria.

¹⁹ Comments of Joseph S. Bermudez on an earlier version of this paper.

- Missiles armed with complete nuclear warheads;
- Nuclear warheads ready to be mounted on missiles;
- Warheads ready to receive fissile material;
- Unarmed nuclear-ready missiles;
- Fissile material components for nuclear warheads;
- Bulk fissile material in various chemical and physical forms prior to fabrication into warhead components;
- Facilities for producing these various items and materials;
- The technical information relevant to all of the above categories; and
- The scientists and engineers involved.

The first six of these would have the greatest immediate danger in the hands of third parties, but in the longer term, North Korean expertise could be of even greater value to an open-ended state-level nuclear weapon program.

Multiple forms of “proliferation” can be imagined in such circumstances. If command structures break down, virtually all of the above nuclear assets would shift rapidly from being under the control of the state to being under the control of entities that are, by definition, “non-state actors.” Assuming that these entities remain internally cohesive, some assets—including those posing the most immediate dangers—would be under the control of custodians in the military and security services, while others would be under the control of the nuclear weapons manufacturing complex.

A number of important studies have focused on the great difficulty that US and South Korean forces would face in locating, securing and rendering safe Pyongyang’s nuclear assets if they entered the North in the course of a regime collapse-triggering conflict.²⁰ One of the most urgent tasks in this regard, these studies stress, would be securing North Korea’s land and maritime borders to prevent leakage of such matériel abroad—a seemingly daunting effort given the

²⁰ Several of these studies include: RAND Corporation, Bruce W. Bennett, “Preparing for the Possibility of a North Korean Collapse,” a report issued in 2013, http://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR331/RAND_RR331.pdf, as well as Bennett’s accompanying briefing before the US-China Economic and Security Review Commission on January 29, 2014, “Preparing for the Possibility of a North Korean Collapse,” http://www.rand.org/content/dam/rand/pubs/testimonies/CT400/CT404/RAND_CT404.pdf. Please also see Michael E. O’Hanlon’s opinion piece for the Brookings Institution in June 2009, “North Korea Collapse Scenarios,” <http://www.brookings.edu/research/opinions/2009/06/north-korea-ohanlon>; and Robert J. Peters’ article for the blog *38 North*, “The WMD Challenges Posed by a Collapse of North Korea,” April 14, 2015, <http://38north.org/2015/04/rpeters041415/>.

massive refugee flows that could be expected and the relatively small physical size of many nuclear assets.²¹

During the period of turmoil, however, it would be difficult for any faction possessing such assets to strike a deal and make them available to a geographically-distant violent extremist group or state. Still, plans might be made by a North Korean faction to cache some of these assets for possible future sale.

Presumably, relatively small quantities of nuclear weapon material or a small number of nuclear warheads would be of particular interest to violent extremists, who could exploit them for political blackmail or a large-scale terrorist attack. In the collapse scenario, the non-state sellers would likely have fewer qualms about making such transfers than a functioning North Korean government.

External states seeking a nuclear weapons capability would likely have greater interest in nuclear weapons technology and expertise than in acquiring a handful of weapons themselves, although in some circumstances, acquiring a somewhat larger number of weapons—perhaps 10 to 20—and the expertise to maintain and use them might be attractive. In mid-2015, however, with the signing of the JCPOA, it is not clear that any state is in the market for such goods.²² This benign situation would, of course, change dramatically if implementation of the JCPOA breaks down or Iran launches a clandestine “sneak out” strategy. Nor can the emergence of new proliferant states be ruled out.

Threatened or actual use of a nuclear weapon by one faction against another within North Korea during a period of civil strife is a possibility lurking in the background. It would become more likely if, for example, the turmoil begins during a confrontation with the South (and the United States), leading North Korean missiles to be armed and deployed, and launch authority, pre-delegated.²³

Given the multiplicity of variables, these scenarios are very difficult to project, but one likely dimension for almost all alternatives is the involvement of China. At a minimum, China would seal its borders with North Korea to control refugee flows. Quite possibly, whether North Korea faced collapse from internal stresses or under invasion, China might send armed columns into North Korea that could include units with nuclear security missions, but given the scale of

²¹ In commenting on an earlier version of this paper, Joseph S. Bermudez differed with this view. “I often wonder about this. A sea blockage of NK is actually a fairly simple thing to effectively accomplish, especially if the Chinese participate. The DMZ, even in wartime, is/would be a significant obstacle for anyone to cross without being approved. The Chinese border does present a problem. Given, however, that in a crisis the PLA [People’s Liberation Army] would both conduct operations from the border and block the border, as one of the last things the Chinese want is an influx of NK refugees, it is likely that it would be difficult to smuggle out significant nuclear assets. Not to mention that the PLA, should it desire, absolutely has the manpower to seal the border.”

²² One scenario brought to the author’s attention by John Schilling is the possibility that leaders faced with prosecution for war crimes or crimes against humanity might seek to acquire ready-to-use nuclear arms as a means of staving off intervention by foreign forces that could lead to their being brought to justice.

²³ Pre-delegation raises other disturbing possibilities, as well, including the possibility of advance authority being given to launch a nuclear attack upon loss of communications with the national command authority.

the problem it is hard to see how this could be effective absent active cooperation from North Korean elements controlling the country's nuclear stores.²⁴

In light of official statements and past behavior, it appears that from a Chinese perspective, the best way to keep the North's nuclear assets secure is to reduce the risk of conflict on the peninsula and to deflect civil turmoil by sustaining the Kim regime with essential foodstuffs, oil and other economic assistance. Ironically, while one might hope that the fall of the regime could usher in a less belligerent and unpredictable replacement and thereby reduce the risk of nuclear conflict, the process of regime change may, itself, open an even more deadly nuclear Pandora's Box.²⁵

Conclusions

As noted at the beginning of this paper, there is no question that North Korea's acquisition of nuclear weapons has created a most serious security challenge for the United States and its allies in Northeast Asia. The unique status of North Korea in the international system, the fact that its nuclear deterrent capabilities are so well advanced compared to the barely nascent military nuclear capabilities of Japan and South Korea, and the potential for constraining the Iranian nuclear program through the JCPOA all point to the likelihood that if North Korea remains internally stable, its nuclear advances will have few reverberations in terms of stimulating proliferation elsewhere. Under some scenarios, however, most importantly if the JCPOA collapses or if Iran secretly violates its provisions, North Korea's defiant nuclear behavior could compound the erosion of global nonproliferation norms and institutions and, in certain circumstances, facilitate the emergence of Iran as a new nuclear power. Moreover, if tensions within North Korea or conflict on the peninsula bring the sudden breakdown of central authority, proliferation through loss of control over the country's nuclear assets would emerge as a grave new danger.

²⁴ In his comments, Joseph S. Bermudez offered a contrary view on this final point, arguing, "It is likely that specialized units of PRC intelligence and specific elements of the XV Airborne Corps and Special Operations Forces have the neutralization of NK nuclear assets and custodial units as a wartime mission—with or without NK cooperation." Execution of that mission may be quite challenging, however, given that North Korean nuclear assets will be dispersed in numerous locations, many of which will have been deliberately obscured as part of North Korean concealment and deception.

²⁵ These challenges point to the need for launching unpublicized consultations with China, conducted at the level of technical experts on managing North Korea's nuclear assets in the event of government failure. Early US discussions of this kind with Russia regarding Syria's conventional weapon arsenal contributed significantly to the rapid diplomatic intervention that led to the elimination of that arsenal after the Ghouta crisis in 2013.

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Washington, DC 20036
www.uskoreainstitute.org

Implications for US Extended Deterrence and Assurance in East Asia

SHANE SMITH

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Dr. Shane Smith is a Senior Research Fellow at the National Defense University's Center for the Study of Weapons of Mass Destruction. His current research focuses on strategic stability and the role of nuclear weapons in Asia-Pacific affairs, extended deterrence, and North Korea's nuclear program. He is also a Special Advisor at the Defense Threat Reduction Agency, where he helps shape and support a strategic engagement and applied research program aimed at reducing WMD dangers. In 2007, Dr. Smith helped launch the WMD Center's Program for Emerging Leaders and was the Program's Director from 2008 to 2012. He has taught national security and nuclear policy related courses at the University of Colorado at Boulder, the National Defense University, and at Johns Hopkins University. Before joining the WMD Center, Dr. Smith worked for former Secretary of Defense William Perry and former Deputy Secretary of Defense Ashton Carter at the Harvard-Stanford Preventive Defense Project. He was also a Research Associate for National Security Studies at the Council on Foreign Relations, where he coordinated two nuclear policy task forces, and a Research Assistant at the Russian-American Nuclear Security Advisory Council. He has published in edited volumes, academic journals, and leading newspapers. Most recently, he co-authored a chapter in Etel Solingen (ed.), *Sanctions, Statecraft, and Nuclear Proliferation* (Cambridge University Press, 2012) and authored a chapter in Jeffrey Larsen (ed.), *Responding to Catastrophic Events: A Consequence Management Reader* (Palgrave MacMillan, 2013).

Implications for US Extended Deterrence and Assurance in East Asia

SHANE SMITH

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IMPLICATIONS FOR US EXTENDED DETERRENCE AND ASSURANCE IN EAST ASIA

Introduction¹

US interests in East Asia are not new, but the global shifts in political, military and economic power from West to East make the region increasingly important. It is now common to hear US leaders say that the country's interests are "inextricably linked" to the Asia Pacific.² The rebalance or pivot strategy is a manifestation of US interests there, and strong alliances with both Japan and South Korea are fundamental to that strategy.³ A nuclear-armed North Korea challenges those alliances by stressing US extended deterrence commitments, which are at the heart of the alliance structure and the basis for the US presence in the region.

The unique challenge for extended deterrence is the need to convince an adversary that the United States is willing to accept high costs in defense of an ally, even though US vital interests are not necessarily at stake—they may be inextricably linked, but they are not innate. The United States would certainly have significant interests threatened by a conflict with North Korea, but for Pyongyang and its neighbors, national survival could very well hang in the balance. A nuclear-armed North Korea might attempt to exploit this apparent asymmetry of interests by raising the potential costs of a conflict for the United States in an effort to persuade it to accept an outcome on Pyongyang's terms rather than take on the threat of nuclear war.

Fear that the United States would be reluctant to run nuclear risks with North Korea, in turn, could lead to questions among US allies about the value of its security commitments. At a minimum, doubt over US commitments could strain the alliances and make cooperation in other areas of US interest more difficult. However, South Korea and Japan could also pursue independent measures to cope with a nuclear-armed North Korea. The worrisome array of actions they could take includes developing independent nuclear capabilities, aligning with China or Russia to help resolve the North Korean threat, and seeking some form of unilateral accommodation with Pyongyang.

North Korea's burgeoning nuclear program is already placing greater demands on US extended deterrence and also raising questions in Seoul and Tokyo about the robustness of

¹ This paper represents the author's personal views and does not necessarily reflect the views of the National Defense University, the Department of Defense or any part of the US government.

² President Obama Addresses the Parliament of Australia, The White House, November 16, 2011, <https://www.whitehouse.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament>.

³ US Department of Defense, "Sustaining US Global Leadership: Priorities for 21st Century Defense," January 2012, http://www.defense.gov/news/Defense_Strategic_Guidance.pdf.

US commitments. These challenges are likely to grow over the coming years, as North Korea appears poised to expand the quantity, quality and diversity of weapons systems in its arsenal in potentially dramatic ways.⁴ Keeping up with the requirements for extended deterrence and assurance is likely to test US policymakers and military planners for the foreseeable future.⁵ Failure to manage related challenges could have far-reaching strategic consequences.

This paper explores the geostrategic implications of a nuclear-armed North Korea—specifically, the challenges for extended deterrence and alliance relations—and the impact of alternative North Korean nuclear “futures.” First, it reflects on a more general debate about whether nuclear weapons reinforce deterrence relationships or embolden aggressive behavior, and what we might expect from North Korea as its nuclear capabilities grow. While it is impossible to know whether and how Pyongyang’s foreign policy would change, there are legitimate reasons for concern. The paper then discusses extended deterrence and assurance challenges in East Asia. It concludes with a discussion about the impact of different North Korean nuclear developments on those challenges over the coming years.

Nuclear Weapons and the Stability of Deterrence

There are two general ways to think about how nuclear weapons affect the foreign policies of the states that have them and their impact on deterrence. Kenneth Waltz and other leading scholars argue that nuclear weapons are inherently stabilizing. Their catastrophic potential bolsters deterrence relationships, and “when countries acquire the bomb, they feel increasingly vulnerable and become acutely aware that their nuclear weapons make them a potential target in the eyes of major powers. This awareness discourages nuclear states from bold and aggressive action.”⁶ If true, then there is little need to worry about the impact of a nuclear-armed North Korea on US extended deterrence. However, other analysts argue that nuclear weapons embolden some states to be more aggressive in pursuit of their political-military objectives. As Paul Kapur finds in the Pakistan case: “Nuclear weapons do enable Pakistan, as a conventionally weak, dissatisfied power, to challenge the territorial status quo with less fear of an all-out Indian military response.”⁷

Insights from recent scholarship suggest that the answer to how nuclear weapons might affect North Korea’s propensity for confrontation and therefore the stability of deterrence turns, in part, on two sub-questions. One, is North Korea a status quo or a revisionist power? That is, is it satisfied with the existing order or does it seek to change that order, using military force if

⁴ David Albright, “Future Directions in the DPRK’s Nuclear Weapons Program: Three Scenarios for 2020,” US-Korea Institute at SAIS, February 2015, <http://38north.org/wp-content/uploads/2015/02/NKNF-Future-Directions-2020-Albright-0215.pdf>. For what these capabilities might mean for North Korea’s emerging nuclear strategy, see Shane Smith, “North Korea’s Evolving Nuclear Strategy,” US-Korea Institute at SAIS, August 2015, http://38north.org/wp-content/uploads/2015/09/NKNF_Evolving-Nuclear-Strategy_Smith.pdf.

⁵ For a discussion of emerging capability requirements and the need for sustained US leadership in East Asia, see Brad Roberts, “Extended Deterrence and Strategic Stability in Northeast Asia,” *NIDS Visiting Scholar Paper Series, No. 1*, August 9, 2013, <http://www.nids.go.jp/english/publication/visiting/pdf/01.pdf>.

⁶ Kenneth Waltz, “Why Iran Should Get the Bomb: Nuclear Balancing Would Mean Stability,” *Foreign Affairs*, July/August 2012, <https://www.foreignaffairs.com/articles/iran/2012-06-15/why-iran-should-get-bomb>.

⁷ For a case study on the impact of nuclear weapons on Pakistan’s behavior, for instance, see S. Paul Kapur, “Ten Years of Instability in South Asia,” *International Security* 33, no. 2 (Fall 2008), pp. 71–94.

necessary, to extend its interests and values? The idea is that, once acquired, nuclear weapons would reinforce Pyongyang's predisposition.⁸

At its core, North Korea appears to be a revisionist state. The Kim regime's political legitimacy has long been pegged to the stated goal of unification, which is enshrined in the country's constitution and the charter of the Workers' Party of Korea.⁹ Kim Jong Un made clear that nuclear weapons serve those revisionist aims when he stated that "Nuclear weapons are the sword that advances the cause of Korean reunification."¹⁰ Indeed, the North has already demonstrated its willingness to leverage nuclear threats in combination with both diplomatic and conventional military provocations to challenge what it contends to be objectionable political and territorial arrangements. It is reasonable to assume that those tendencies could grow along with the North's nuclear capabilities.

The second question stems from work in behavioral economics. Is North Korea's leadership risk averse or risk acceptant? The literature suggests that leaders might take greater risks when they face the prospect of pending losses in an increasingly desperate situation rather than for pure gains when things are going relatively well.¹¹ This has implications for deterrence on a couple of levels. On a macro level, with the exception of its nuclear weapons, North Korea is declining in relevancy compared with its modern and economically superior neighbors. It has fewer vested interests in a stable regional status quo that unevenly benefits others, including the United States and South Korea. Its leaders might look at trend lines in the region and decide that particularly bold actions are necessary to reassert control over their ability to shape future political outcomes. It would thus be unsurprising if the North used nuclear threats and provocations in an effort to generate instability that, in turn, might open opportunities to advance its interests. Statements out of Pyongyang suggest that its leaders are in fact thinking about how to exploit nuclear weapons to "dictate" international trends and regional relations.¹²

On a domestic level, perennial reports surface of internal rivals and purges in North Korea. For instance, after the public execution of Jang Song Thaek, Kim Jong Un's uncle and the vice chairman of the National Defense Commission, North Korean media labeled him a traitor and suggested that other "anti-party, counter-revolutionary factional elements" will be rooted out.¹³ More recently, Kim Jong Un reportedly canceled a trip to Moscow in order to see to internal affairs. Shortly thereafter, Hyon Yong Chol, the minister of the People's Armed Forces, was

⁸ Ibid.

⁹ Nicholas Eberstadt, *The End of North Korea* (Washington, DC: The AEI Press, 1999), p. 25. Also see Sung Yoon-Lee, "North Korea's Revolutionary Unification Policy," *International Journal of Korean Studies* XVIII, no. 2 (Fall 2014), pp. 121–37.

¹⁰ Alexandre Mansourov, "Kim Jong Un's Nuclear Doctrine and Strategy: What Everyone Needs to Know," Nautilus Peace and Security Network, December 16, 2014, <http://nautilus.org/napsnet/napsnet-special-reports/kim-jong-uns-nuclear-doctrine-and-strategy-what-everyone-needs-to-know/>.

¹¹ The seminal work for this research program is Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47, no. 2 (March 1979), pp. 263–91.

¹² See Mansourov, "Kim Jong Un's Nuclear Doctrine and Strategy: What Everyone Needs to Know."

¹³ Adam Cathcart, "'Thrice-Cursed Acts of Treachery'? Parsing North Korea's Report on the Execution of Kim Jong Un's Uncle: An annotated guide to one of the most grandiose news bulletins ever released," *Atlantic*, December 13, 2013, www.theatlantic.com/international/archive/2013/12/-thrice-cursed-acts-of-treachery-parsing-north-koreas-report-on-the-execution-of-kim-jong-uns-uncle/282339/.

ousted (some suggest that he was executed for treason) and replaced by the sixth minister since 2011.¹⁴ While North Korea watchers debate the meaning of such reports, they do portend a leadership that may face real internal challengers. At the very least, one could infer that the Kim regime's hold on power is not absolute and that it is at times willing to take presumably risky measures to (re)assert control.

A worsening domestic situation, of course, can lead to risky external behavior. Scholars have argued that states will sometimes engage in provocative behavior and even full-scale war as a diversionary tactic to deflect attention from domestic woes or to galvanize opposition to domestic challengers.¹⁵ This should be a familiar theme to most North Korean analysts since domestic motivations have long been considered a primary driver for North Korea's external provocations. For instance, some analysts speculate that securing the military's backing for the transition of leadership to Kim Jong Un from his father, Kim Jong Il, was a primary motivation for the sinking of the *Cheonan* and shelling of Yeonpyeong island in 2010.¹⁶ Nuclear weapons could provide the North with added confidence that it can launch such diversionary provocations with relative impunity in the future.

The answers to these questions do not bode well for the stabilizing prospects of a nuclear-armed North Korea. However, it would be wrong to assume that increased confidence in its nuclear weapons will fundamentally alter North Korea's behavior. First, its leaders are not irrational or suicidal. We should not expect nuclear weapons to suddenly trigger a reckless drive toward unification or a nuclear attack from out of the blue, for instance. Second, North Korea has a long history of limited but violent provocations, ostensibly to either weaken, delegitimize and humiliate South Korea and the United States or to shore up domestic support. Nuclear weapons might make such conduct more frequent or intense with real implications for extended deterrence and assurance, but the difference in North Korea's behavior may be one of degree rather than a fundamental change.

Extended Deterrence and Assurance Challenges

It is important to consider extended deterrence and assurance challenges in the context of broader US strategic interests. Effective deterrence rests not only on the balance of capabilities but also on the balance of interests at stake in a particular conflict.¹⁷ The balance of interests is particularly important for extended deterrence because it faces a structural problem that sets it apart from more straightforward deterrence: it requires convincing an adversary that the United States is willing to accept high costs in defense of an ally even in situations where its national interests are not self-evident.

¹⁴ Alexandre Mansourov, "The Rise and Fall of General Hyon Yong Chol," *38 North*, July 14, 2015, http://38north.org/2015/07/amansourov071415/#_ftn1.

¹⁵ For recent work on this line of research, see Amy Oakes, *Diversionary War: Domestic Unrest and International Conflict* (Stanford, CA: Stanford University Press, 2012).

¹⁶ For instance, see David E. Sanger, "US Implicates North Korean Leader in Attack," *New York Times*, May 22, 2010, www.nytimes.com/2010/05/23/world/asia/23korea.html.

¹⁷ Richard Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, DC: Brookings Institution Press, 1987).

What is the balance of interests? As mentioned above, the Asia Pacific region is increasingly important for American prosperity and global leadership. It is home to about 40 percent of the world's population and nearly 60 percent of global GDP, with economies that similarly represent about 60 percent of overall US trade.¹⁸ The region is also host to six countries with nuclear weapons programs, including North Korea; three of the world's six largest defense budgets; and six of the world's largest militaries. Moreover, overlapping rivalries and multiple territorial disputes across Asia also involve US allies.¹⁹

The US rebalance strategy is an expression of its growing interests in the region. Fundamental to that strategy and to the US regional presence are its alliances with both Japan and South Korea. As the 2012 Department of Defense *Strategic Guidance* specifies, “Our relationships with Asian allies and key partners are critical to the future stability and growth of the region. We will emphasize our existing alliances, which provide a vital foundation for Asia-Pacific security.”²⁰ In a speech at the US Military Academy in 2014 on the use of force, President Obama went on to argue that the security of those and other allies is a core US interest that is worth fighting for.²¹

The United States may have significant interests at stake and the will to defend regional allies, but its national survival is unlikely to be threatened in a conflict on the Korean peninsula.²² For North Korea and its neighbors, survival may very well be on the line in a potential war. This apparent asymmetry of interests exposes the fundamental challenge for extended deterrence against a nuclear-armed North Korea: its leaders might think that by threatening nuclear attack, they can raise the potential costs of a conflict beyond what the United States is willing to accept and thereby persuade it to agree to an outcome on Pyongyang's terms.

Of course, North Korea has a long history of making threats ostensibly aimed at conveying its willingness—and not necessarily its capability—to impose and accept far greater costs than the United States. For instance, in the days following North Korea's seizure of the *USS Pueblo* in 1968, it threatened “genocidal blows” in response to a kinetic US response. Since the early 2000s, Pyongyang's over-the-top threats such as turning Seoul into a “sea of fire” have become almost commonplace. The problem today is that North Korea could potentially make good on

¹⁸ Brock R. Williams, “Trans-Pacific Partnership (TPP) Countries: Comparative Trade and Economic Analysis,” *Congressional Research Service*, June 10, 2013, p. 2.

¹⁹ David J. Berteau, Michael J. Green, et. al., *US Force Posture Strategy in the Asia Pacific Region: An Independent Assessment*, Center for Strategic and International Studies, August 2012, p. 13, http://csis.org/files/publication/120814_FINAL_PACOM_optimized.pdf.

²⁰ Department of Defense, *Sustaining Global Leadership: Priorities for 21st Century Defense*, January 2012, p. 2, http://www.defense.gov/news/Defense_Strategic_Guidance.pdf.

²¹ Remarks by the President at the United States Military Academy Commencement Ceremony, The White House, May 28, 2014, <https://www.whitehouse.gov/the-press-office/2014/05/28/remarks-president-united-states-military-academy-commencement-ceremony>.

²² US regional priorities are often characterized as preserving a balance of power that prevents the rise of a hegemon or group of powers that would deny US access to the region; preventing military threats against the US homeland and its allies—defeating those threats, if needed; promoting and maintaining free and secure markets; stemming proliferation; and promoting democracy and human rights. See, for instance, Ralph Cossa, Brad Glosserman, et. al., *The United States and the Asia-Pacific Region: Security Strategy for the Obama Administration*, Center for a New American Security, February 2009, p. 10, www.cnas.org/files/documents/publications/CossaPatel_US_Asia-Pacific_February2009.pdf.

such threats as its nuclear capabilities grow. This has a number of implications for extended deterrence that are discussed below.

“Decoupling” 2.0

During the Cold War, the United States extended security commitments to Western Europe that were ultimately backed by its strategic arsenal—and today, it still does. When the US homeland became vulnerable to Soviet nuclear weapons, many security experts on both sides of the Atlantic worried that leaders in Moscow might doubt US resolve. A common refrain, “Would the United States trade New York to defend Berlin, Washington for Bonn?” captured the dilemma of mutual nuclear vulnerability for extended deterrence. The fear that the US strategic commitment could be “decoupled” from its North Atlantic Treaty Organization (NATO) allies was a persistent concern for most of the Cold War.

Today, similar concerns are emerging as North Korea pursues intercontinental ballistic missiles, particularly the road mobile KN-08. If and when North Korea can target US cities with nuclear weapons, would the United States risk San Francisco, Los Angeles or Honolulu to defend Seoul or Busan? There is good reason to believe that North Korea’s strategy behind building intercontinental missiles is aimed at decoupling the US-South Korea alliance. As far back as the 1980s, during the early developments of the Taepodong missile, Kim Jong Il reportedly remarked, “if we can develop this we have nothing to fear. Even the American Bastards won’t be able to bother us.”²³

There is a new wrinkle to this old problem. Japan is first on North Korea’s nuclear target list, or so it has said.²⁴ This may be part of a “triangular decoupling” strategy. On one level, North Korean leaders might think that by threatening Japan, the United States would be forced to “choose” between allies and that it would be reluctant to risk Japan over a fight on the peninsula. On another level, North Korean leaders could think that nuclear threats would prevent Japan from supporting US efforts to defend South Korea. Indeed, the efficient and effective execution of the US non-nuclear extended deterrence commitments to South Korea involves logistical support from bases located in Japan—United Nations Command Rear is in fact co-located with United States Forces Japan on Yokota Air Base. The emerging dilemma was captured in a familiar way by one Japanese strategist who stated during a recent Track II Dialogue that “We are increasingly being asked to trade Tokyo for Seoul.” Prime Minister Shinzo Abe has similarly made statements that suggest Japan’s consent to using bases located on its soil to defend South Korea should not be taken for granted.²⁵

²³ Reported by a defector and quoted in a number of publications from the 1990s. Terence Rohrig, *From Deterrence to Engagement: The US Defense Commitment to South Korea* (Lexington Books, 2007), p. 90.

²⁴ “North Korea states ‘nuclear war is unavoidable’ as it declares first target will be Japan,” *Express* (Tokyo), April 12, 2013. See also Max Fisher, “Here’s North Korea’s official declaration of ‘war,’” *Washington Post*, March 30, 2013.

²⁵ For a discussion of Abe’s comments, see Jeffrey W. Hornung, “Japan Chair Platform: Japan Matters for South Korea’s Security,” Center for Strategic and International Studies, November 10, 2014, www.csis.org/publication/japan-chair-platform-japan-matters-south-koreas-security-0.

During the Cold War, NATO allies did not face this kind of triangular decoupling problem. The bedrock of the NATO alliance was and is a collective defense agreement, whereby an attack on one is an attack on all. No such commitment exists between Japan and South Korea. To the contrary, political relations between the two countries are rocky at best and often spiked by open acrimony. While there has been recent progress toward trilateral talks and better information sharing, historical animosity between Tokyo and Seoul still hinders robust cooperation and dialogue regarding contingencies on the peninsula.

Stability-Instability Paradox Redux

In 1965, Glenn Snyder argued that the catastrophic consequences of nuclear war provided for a certain level of strategic stability between nuclear adversaries. No leader would want to escalate conflict to the nuclear threshold for fear of crossing it. Paradoxically, however, stability at the high end of conflict could create overall instability by making lower levels of conflict relatively safe and thereby erode extended deterrence.²⁶

In the North Korea context, some experts fear that its leaders might see a survivable second-strike capability as a shield from behind which it can launch conventional provocations and war.²⁷ In short, a survivable second-strike might give North Korea's leaders confidence that they can manage the risks of escalation because nuclear weapons would deter a full retaliatory response from the United States and South Korea. As a result, North Korean leaders might calculate that they can launch a conventional offensive at some favorable time, if only to achieve limited objectives, before using the threat of nuclear attack to sue for peace on their terms.

Some analysts may be unconcerned about North Korea's conventional military capabilities and therefore indifferent to this threat. It is true that allied forces far outmatch those in North Korea, but Pyongyang's conventional threat cannot be easily dismissed. It is widely believed that North Korea's military strategy and operational concepts are based on conducting quick and decisive assaults that can present a *fait accompli* before the United States can get reinforcements to the peninsula. Once US reinforcements arrive, the more assured is North Korea's defeat. This strategy is evident in reports about North Korea's military posture. For instance, the International Institute for Strategic Studies estimates that 70 percent of its forces are forward deployed to allow rapid invasion of the South in as little as 48 to 72 hours without further deployments or supplying. Those forces include approximately 650,000 troops, 8,000 artillery, 2,000 tanks and formidable special operations forces numbering around 100,000.²⁸ Of course, North Korea does not need to unify the peninsula to inflict a significant blow against the alliance. It could pursue

²⁶ Glenn H. Snyder, "The Balance of Power and the Balance of Terror," in Paul Seabury, ed., *The Balance of Power* (San Francisco, CA: Chandler, 1965), pp. 196–201.

²⁷ Joseph Bermudez interviewed North Korean officials and concluded that for its leaders, "detering the United States also creates the opportunity to reunify Korea by force and under their terms." Joseph S. Bermudez, Jr., "The Democratic People's Republic of Korea and Unconventional Weapons," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, eds., *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons* (Ithaca, NY: Cornell University Press, 2000), p. 183.

²⁸ The International Institute for Strategic Studies, *North Korean Security Challenges: A Net Assessment* (London: The International Institute for Strategic Studies, 2011), p. 49.

much more limited aims, such as taking territory across the demilitarized zone or islands along the Northern Limit Line that it claims are in dispute.

As North Korea's confidence grows in its strategic deterrent—i.e., the ability to target major population centers in South Korea, Japan and the United States—it might even think that it could use nuclear weapons in a limited fashion. For instance, it might think that it could use nuclear weapons for psychological effects during a conflict by firing a demonstration shot; for area denial effects by targeting access points to North Korea or military ports in the South, such as the Port of Busan, where the US might otherwise disembark forces; or for operational effects by targeting military bases away from civilian population centers, such as air bases at Kunsan and Osan. Even the limited use of nuclear weapons, however, would be extraordinarily risky, if only because such use would most certainly increase the stakes of the conflict for the United States, South Korea and much of the world. But it may be a risk that North Korea is willing to run during a conflict in which survival of the regime is at stake; more so, if it has confidence in a survivable second-strike strategic deterrent.

Balancing Pre-war and Intra-war Deterrence Imperatives

Effective deterrence is often thought to require, as the 2014 *Quadrennial Defense Review* states, “communicating to potential nuclear-armed adversaries that they cannot escalate their way out of failed conventional aggression.”²⁹ To be sure, the United States presents overwhelming military power to adversaries like North Korea. And, during conflict, it tends to apply its military superiority in a decisive and overwhelming fashion from the start. Keir Lieber and Daryl Press argue that it is precisely US military superiority and the way that it is employed that could incentivize a country like North Korea to use nuclear weapons early in a conflict.³⁰ The longer the conflict goes on, the more likely it is going to end very badly for the regime—and even on a personal level (think Saddam Hussein, Muammar Gaddafi, and Slobodan Milosevic).

For North Korea, a sense of fatalism could be triggered even without the prospect of a decisive military defeat. Some observers believe that the regime is brittle—outwardly rigid and hard but if struck in the right spot, like a partial but humiliating military defeat, it could shatter or unravel. Early but limited use of nuclear weapons might be seen by North Korea's leaders as the best way to stave off that fate.

Unless the US and South Korean goal is regime change, one way to reduce the incentives for early nuclear use by North Korea and to restore deterrence during a conflict might be to have graduated military options and clearly communicated “off-ramps” that offer the regime viable alternatives to escalation. To be successful, however, these would likely need to be telegraphed well before a war breaks out. Signals of restraint and off-ramps are less likely to be received and trusted in the fog of war. The dilemma for deterrence is the potential of unintentionally signaling to North Korea's leadership that its nuclear weapons buy it space on the proverbial ladder of escalation and that it can manage the risks of low-level conflict. As Robert Jervis

²⁹ Department of Defense, *Quadrennial Defense Report 2014*, March 2014, p. 13, http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

³⁰ Daryl Press and Keir Lieber, *Coercive Nuclear Campaigns in the 21st Century: Understanding Adversary Incentives and Options for Nuclear Escalation* (Monterey, CA: US Naval Postgraduate School, March 2013).

has argued, stable deterrence actually results from the fear of unmanageable escalation and instability.³¹ Without that fear, deterrence on the peninsula could give way to provocations and miscalculation. Once war breaks out, however, that fear provides Pyongyang with few incentives for restraint.

The Other Side of the Deterrence Coin: Assuring Allies

US allies are keenly aware of the extended deterrence challenges posed by a nuclear-armed North Korea. Nowhere is this more visible than in South Korea, where debate over whether to develop an independent nuclear capability or whether to request US redeployment of nuclear weapons to the peninsula has gained ground. A decade of polling from a number of sources suggests that a consistent majority of South Koreans support an independent nuclear program as well as the return of US nuclear weapons. Two separate polls conducted after North Korea's third nuclear test in 2013 found that nearly two-thirds of respondents (to date, the highest mark in available polling data) favor both of those strategies.³²

Conversations with many South Koreans suggest that this is partially driven by a frustration about the lack of alternative response options to North Korea's nuclear developments and provocations. However, others argue that it stems from anxiety over US security commitments. On one level, they point to observations that raise concerns about US retrenchment, such as economic and political morass, political discomfort with hegemony, a resurgence of isolationism in US politics, and a willingness to negotiate when "redlines" are crossed (for example, when Syria used chemical weapons). On another level, there is growing doubt about US willingness to use its nuclear weapons in defense of South Korea. For instance, a 2012 poll found that while South Korean public support for the US-ROK alliance was at an all-time high with a 94 percent approval rating, less than half of the respondents believed that the United States would use nuclear weapons even if the North attacked the South with nuclear weapons first.³³

Despite a significant portion of the population favoring nuclear weapons in South Korea, only a slow trickle of politicians and opinion leaders have publicly called for such actions. Most notably, former presidential candidate, founder of the Asan Institute for Policy Studies, and heir to the Hyundai conglomerate, M.J. Chung, argued, "South Korea may exercise the right to withdraw from the NPT [and begin to] match North Korea's nuclear program step by step."³⁴ Representative Shim Jae-cheol similarly reasoned that "the only way to defend our survival would be to maintain a balance of terror that confronts nuclear with nuclear ... We will have to push forward with ... redeploying US tactical nuclear weapons."³⁵

³¹ Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1989).

³² Wade Huntley offers a useful summary of these polls in "Speed Bump on the Road to Global Zero: US Nuclear Reductions and Extended Deterrence in East Asia," *The Nonproliferation Review* 20, no. 2 (July 2013), pp. 322–23.

³³ Jiyeon Kim, Karl Friedhoff, and Kang Chungku, "The Fallout: South Korean Public Opinion Following North Korea's Third Nuclear Test," Issue Brief no. 46, Asan Institute for Policy Studies, February 23, 2013.

³⁴ For a video of his keynote talk at the Carnegie International Nuclear Policy Conference, see <http://carnegieendowment.org/2013/04/09/keynote-m.j.-chung-member-national-assembly-of-republic-of-korea/fv9t>.

³⁵ "Saenuri calls for nuclear capability to deter the North," *Korea JoongAng Daily*, February 19, 2013, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2967341>.

The reason for this divide between public opinion and the positions of political leaders could be due in part to a stronger appreciation within the political and strategic communities for the US alliance—flaws and all—and the damage that nuclear appeals would likely have on the relationship. However, as in any democracy, it would not be surprising to see political opinions begin to more closely reflect public opinion, particularly if North Korea continues to build up its nuclear capabilities or if confidence wanes in the US extended deterrent. Indeed, it is also worth keeping in mind that South Korea previously explored and invested in elements of a secret nuclear weapons program in the 1970s when it was concerned about US security commitments.³⁶

The United States has committed to strengthening extended deterrence and to assuring South Korea of US resolve in the face of a nuclear-armed North Korea. For instance, President Barack Obama and other senior government officials have made repeated statements obligating the full range of US capabilities, including nuclear weapons, to the defense of South Korea. A forum to jointly address future challenges to extended deterrence, the Extended Deterrence Policy Committee, was established in 2010 and the US-ROK Tailored Deterrence Strategy was signed in 2013, reportedly to jointly address the threat of North Korea's weapons of mass destruction programs.³⁷ To address lower-level provocations under the shadow of nuclear weapons, the US-ROK Counter Provocation Plan was developed that same year. There have also been highly visible joint military exercises involving the public overflight of US nuclear-capable bombers and the announcement to increase US missile defenses against the North Korean nuclear threat. Some South Koreans, however, are looking for firmer commitments, including an explicit declaratory policy about the conditions under which the United States would use nuclear weapons in their defense, and coordination such as a NATO-like nuclear planning group and sharing arrangement.³⁸

South Korea is also developing independent conventional capabilities and sending deterrence signals to North Korea, arguably to fill perceived gaps in US extended deterrence. However, this could lead to mixed deterrence messages and uncoordinated or unintended escalation. For instance, South Korea has developed what some call a “proactive deterrence” posture, which reportedly promises to “take prompt, focused, and disproportionate retaliatory (and perhaps even preemptive) actions in order to raise the costs to North Korea of small-scale attacks,” presumably before consultation or coordination with the United States.³⁹ It is also developing what has been labeled a “kill chain” system to swiftly detect, target and destroy North Korean nuclear and missile assets during a crisis.⁴⁰ It is unclear in the literature when or how the “kill chain” would

³⁶ Jonathan D. Pollack and Mitchell B. Reiss, “South Korea: The Tyranny of Geography and the Vexations of History,” in Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss, eds., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices* (Washington, DC: The Brookings Institution Press, 2004), pp. 254–92.

³⁷ Karen Parrish, “US, South Korea Announce ‘Tailored Deterrence’ Strategy,” *Armed Forces Press Service*, October 2, 2013.

³⁸ For a discussion of some of these sentiments, see Chang Kwoun Park, “ROK–US cooperation in preparation for hostile actions by North Korea in possession of nuclear weapons,” *Korean Journal of Defense Analysis* 22, no. 4 (2010), pp. 499–513.

³⁹ Abraham M. Denmark, “Proactive Deterrence: The Challenge of Escalation Control on the Korean Peninsula,” *Korea Economic Institute: Academic Paper Series*, December 2011, http://keia.org/sites/default/files/publications/proactive_deterrence_paper.pdf.

⁴⁰ James Hardy, “North Korea, Beware of Seoul’s Mighty Missiles,” *National Interest*, July 2, 2014, <http://nationalinterest.org/feature/north-korea-beware-seouls-mighty-missiles-10792>.

be employed and whether pre-coordination with the United States would be required. South Korea has also signaled its intent to target North Korea's leadership in a conflict. It recently released a video of cruise missile tests, stating: "The cruise missile being unveiled today is a precision-guided weapon that can identify and strike the window of the office of North Korea's leadership."⁴¹ More bluntly, one Ministry of Defense spokesman responded to North Korea's threat to attack the South with a pre-emptive nuclear strike by saying "If North Korea is to attack the South with its nuclear weapons ... Kim Jong Un's regime will cease to exist on the face of Earth."⁴²

Japan is also wrestling with uncertainty about the future of US security commitments in a changing regional and global environment. Some analysts argue that Japan is at a critical juncture in its security policy, driven both by North Korea's nuclear program and the rise of China.⁴³ In the minds of some regional experts, the two threats are not mutually exclusive. North Korea is sometimes considered the "cat's paw" in a Chinese strategy to push the United States out of the region, antagonize and distract Japan, and pave the way for China's regional expansion.⁴⁴ Regardless of the actual link between China and North Korea, the rising costs of US regional deterrence against multiple nuclear threats heighten Japan's long-term anxiety over US security commitments.⁴⁵

North Korea's growing capabilities and threats generate three immediate kinds of concerns in Japan. First, North Korea could launch non-nuclear provocations against Japan while using nuclear threats to deter retaliation. Second, Japan would be a primary nuclear target during a conflict that it cannot control on the peninsula. Indeed, many Japanese take Pyongyang at its word when it states that "Japan is always in the [nuclear] cross-hairs of our revolutionary army and if Japan makes a slightest move, the spark of war will touch Japan first."⁴⁶ Third, once North Korea can target the US homeland with nuclear weapons, it can intimidate Washington in a way that leaves Japan vulnerable to coercion. For instance, one former Japanese defense official reportedly opined about the implications of a nuclear-armed North Korea, "we cannot completely rule out the possibility of Japan's being cut off from US nuclear strategy."⁴⁷ Faced with these

⁴¹ "South Korea unveils missile it says can hit North's leaders," *Reuters*, February 14, 2013, <http://www.reuters.com/article/2013/02/14/us-korea-north-missile-idUSBRE91D07P20130214>.

⁴² K.J. Kwon, "Under threat, South Koreans mull nuclear weapons," *CNN*, March 18, 2013, <http://www.cnn.com/2013/03/18/world/asia/south-korea-nuclear/>.

⁴³ Ariana Navarro Rowberry, "Advanced Conventional Weapons, Deterrence and the US-Japan Alliance," Brookings Institution, December 2014, www.brookings.edu/~media/research/files/reports/2015/01/06-advanced-conventional-weapons-deterrence-us-japan-alliance-rowberry/advanced-conventional-weapons-deterrence-and-the-us-japan-alliance--rowberry.

⁴⁴ Noah Feldman recently characterized North Korea as a "nuclear proxy" for China in advancing its regional interests. Noah Feldman, "Why China's OK with North Korea's Nuclear Nuttiness," *Bloomberg Views*, May 21, 2015, www.bloombergvew.com/articles/2015-05-21/why-china-s-ok-with-north-korea-s-nuclear-nuttiness.

⁴⁵ Yukio Satoh, "Agenda for Japan-US Strategic Consultations," in *Major Powers' Nuclear Policies and International Order in the 21st Century*, Report of the NIDS International Symposium on Security Affairs 2009 (Tokyo: National Institute for Defense Studies, 2010), pp. 21–34.

⁴⁶ "North Korea states 'nuclear war is unavoidable' as it declares first target will be Japan," *Express* (Tokyo), April 12, 2013.

⁴⁷ As quoted in Richard J. Samuels and James L. Schoff, "Japan's Nuclear Hedge: Beyond 'Allergy' and Breakout," in Ashley J. Tellis, Abraham M. Denmark and Travis Tanner, eds., *Strategic Asia 2013–2014: Asia in the Second Nuclear Age* (Washington, DC: National Bureau of Asian Research, 2013), p. 245.

challenges, Japan has engaged in intense debate over new policies to address a changed and changing security environment.

Calls in Japan for a more robust US nuclear presence or for independent capabilities are quieter than in South Korea. Public opinion and institutional opposition to nuclear weapons continue to shape Japanese discourse on such issues. However, a growing number of US and Japanese analysts argue that Japan's indefinite renunciation of nuclear weapons cannot be taken for granted; it would likely consider changing course if the security environment deteriorated or if it lost faith in the US extended deterrent.⁴⁸ As Richard Samuels and James Schoff suggest, since the 1950s, Japan has more or less made clear that it reserves the right, and maintains the capacity, to develop its own nuclear arsenal if the situation warrants it.⁴⁹

Meanwhile, Japan is already exploring other measures to augment the US deterrent, arguably in areas where it sees US assurances lacking. For instance, there is now debate in Japan over developing a conventional strike capability that could, as Prime Minister Abe reportedly told the National Diet, "hit enemy bases in accordance with the changing international situation."⁵⁰ A primary justification for such capabilities is the need to conduct preemptive counterforce operations against a nuclear-armed North Korea.⁵¹ Unsurprisingly, these discussions raise regional concerns about a fundamental shift in Japan's military posture partly because the debate is taking place in the context of Japan's reinterpretation of the constitution to enable "collective self-defense" and the 2013 *National Security Strategy* that argues for the need "to first and foremost strengthen its own capabilities and the foundation for exercising those capabilities."⁵² Not only do these developments have the potential to aggravate Japan's relations with both South Korea and China, but it is also not clear in the literature how the changes and new capabilities would work within the structure of the US-Japan alliance. A lack of coordination between the two could lead to dangerous and unhelpful escalation during conflict on the peninsula.

In an effort to enhance consultation on future challenges and the role of US extended deterrence, the US and Japan established the Extended Deterrence Dialogue. There have also been repeated statements from US political leaders recommitting the full range of US capabilities to the defense of Japan. The United States has also committed additional capabilities to signal its willingness and ability to uphold its security commitments, such as the deployment of additional missile defense assets to the region, including plans to increase ground-based interceptors for national missile defense; deployment of additional Aegis-equipped warships to the West Pacific; and the deployment of a Terminal High Altitude Area Defense battery to Guam. These may not be sufficient for assuring Japan in the future, however, as it faces an increasingly nuclear-capable and unpredictable North Korea.⁵³

⁴⁸ Ibid, pp. 233–64.

⁴⁹ Ibid.

⁵⁰ "Japan Eyes Cruise Missiles to Attack N. Korea," *Chosun Ilbo*, February 21, 2013, http://english.chosun.com/site/data/html_dir/2013/02/21/2013022101139.html.

⁵¹ See Narushige Michishita, "Japan's Response to Nuclear North Korea," *Joint US-Korea Academic Studies* 23 (2012), pp. 99–112.

⁵² Japanese Ministry of Defense, *National Security Strategy* (December 17, 2013), p. 14, emphasis added.

⁵³ For more on the debate about capability requirements for extended deterrence and assurance of Japan in particular, see Roberts, "Extended Deterrence and Strategic Stability in Northeast Asia."

The Impact of Three Future North Korean Nuclear Scenarios on Extended Deterrence and Assurance

North Korea's Nuclear Futures: Technology and Strategy offers three scenarios for where North Korea's nuclear capabilities could be in five years.⁵⁴ The low-end scenario posits a North Korean nuclear stockpile of roughly 20 weapons with yields of around 10 kilotons (kt) and minimum advancements in delivery systems that are limited to regional targets. The medium-range scenario suggests the North's arsenal grows to 50 weapons, with yields in the 10–20 kt range and the possibility of new designs achieving 50 kt. In this case, North Korea has also made advances that allow it to mount warheads on road-mobile missiles of intercontinental, intermediate and short-range distances with moderate confidence in those delivery systems. The high-end scenario estimates North Korea with 100 weapons and an average stockpile yield of around 20 kt, but an increasing number of weapons that are capable of achieving 50 kt yields. It has fairly high confidence in its missile systems and is also able to deploy battlefield or small so-called tactical weapons. The different scenarios would have different implications for extended deterrence.

The low-end scenario would continue to present decoupling challenges but primarily through triangulation—i.e., increased targeting of Japan in an effort to compel the United States to “choose” between allies or to peel Japan away from supporting US efforts to defend South Korea. This indirect threat to the United States has two implications. First, it places a premium on trilateral cohesion and cooperation among the United States, Japan and South Korea. Trilateral progress in areas such as information sharing, crisis coordination and missile defense could be helpful, but the main problem is political. As long as there is a political divide between Seoul and Tokyo, North Korean leaders might see a vulnerability that can be exploited.⁵⁵ US pressure may be needed to bring Japan and South Korea closer together to present a united front against provocations. Pressing too hard for trilateral cooperation, however, could lead to a domestic backlash in one or both of the countries, given the state of political relations between the two, which could further expose the trilateral gap and also affect US bilateral relations.

Second, the indirect nature of the threat against the United States in the low-end scenario would be less likely to provide North Korea with a high level of confidence that it could use nuclear weapons as a shield from behind which it could launch major provocations. Presumably, its leaders would be less willing to really test the durability of a strategic deterrent comprised of a relatively small number of warheads on relatively vulnerable and low-confidence delivery systems that cannot reach their primary opponent, the United States.⁵⁶ Pyongyang might nonetheless believe that nuclear threats against Seoul and Tokyo provide sufficient high-end

⁵⁴ Joel Wit and Sun Young Ahn, “North Korea's Nuclear Futures: Technology and Strategy,” US-Korea Institute at SAIS, February 2015, <http://38north.org/wp-content/uploads/2015/02/NKNF-NK-Nuclear-Futures-Wit-0215.pdf>.

⁵⁵ As Michael Wheeler finds, “security relationships are first and foremost political relationships. If the overall political relationship is not healthy, it is unlikely that the security relationship can remain durable and strong.” Michael O. Wheeler, *The Changing Requirements of Assurance and Extended Deterrence* (Washington, DC: Institute for Defense Analyses, 2010), p. 48.

⁵⁶ That is ostensibly why Kim Jong Un has identified the ability to strike the United States as a requirement for deterrence. Kim Jong Un at the March 31, 2013, plenary meeting of the Workers' Party of Korea Central Committee, *Korean Central Broadcasting Station* in Korean, April 1, 2013, available at http://www.ncnk.org/resources/news-items/kim-jong-uns-speeches-and-public-statements-1/KJU_CentralCommittee_KWP.pdf.

stability to engage in low levels of provocation similar to the ones that it launched in 2010—provocations that might fall below the presumed threshold for US action. Since US extended deterrence is generally aimed at higher levels of conflict, the United States would need to continue to invest in coordination, planning and joint communication with South Korea and Japan to signal to Pyongyang that the allies can effectively respond to and dominate at all levels of conflict. Such coordination might entail US allies, ultimately backed by the United States, taking on increasing and leading roles in responding to a broader range of North Korean provocations. As allies adopt related policies and build required capabilities, such as independent and potentially preemptive strike options, the risks of confused deterrence messages and uncoordinated or unintended escalation could grow in the absence of close and consistent consultation and planning.

For the medium-range scenario, North Korea would be able to target the United States as well as large population centers in South Korea and Japan, while its mobile missiles could provide it with a more secure second-strike capability. The higher yields could also provide it with greater confidence in its ability to destroy intended targets, while the increased number of weapons might enable it to launch one salvo and retain enough weapons to threaten additional attacks. This scenario has a number of implications for extended deterrence beyond those discussed in the first scenario.

First, the decoupling challenge is more direct than in the low-end scenario. As such, there would likely be a swell of emphasis on both US offensive and defensive capabilities, such as conventional precision-strike and national missiles defenses, to reduce if not eliminate US vulnerability to North Korea's limited arsenal and thus reinforce the US intention to defend its regional allies.⁵⁷ In turn, a buildup of conventional strike capabilities that could provide preemptive or first strike options along with missile defenses is likely to have a negative impact on US relations with Russia and China since both express concerns that those capabilities could be turned against their strategic deterrents.⁵⁸

Second, if North Korea's confidence in its strategic deterrent against the United States grows, it might be more willing to take on the risk of larger-scale provocations and even major conflict. The North might calculate that a more robust strategic deterrent would force allies to respond in limited ways for fear of escalation and, in effect, offer the regime intra-war opportunities to sue for a satisfactory resolution of the conflict. However, North Korea would still face a conventionally superior adversary backed by a larger and more capable nuclear arsenal. Despite having enough weapons for multiple attacks, its leaders might conclude that the suicidal threat of attacking major population centers would ring hollow except in the grimmest situations—situations the regime itself would want to avoid.

The high-end scenario suggests that North Korea would have a much larger nuclear arsenal that not only offers a robust strategic deterrent, but also battlefield or tactical weapons that could be

⁵⁷ Brad Roberts, "On the Strategic Value of Ballistic Missile Defense," *Proliferation Papers*, Institut Français des Relations Internationales, June 2014.

⁵⁸ For a recent discussion about Chinese and Russian concerns, see Richard Weitz, "Arms Racing in Strategic Technologies: Asia's New Frontier," Hudson Institute, May 3, 2015, www.hudson.org/research/11307-arms-racing-in-strategic-technologies-asia-s-new-frontier.

used to offset conventional inferiority and provide a graduated set of target and yield options. This would offer North Korea the greatest level of confidence that it could achieve its goals in major conflict and, therefore, it might be more willing to launch a major offensive. It might even believe that it could use nuclear weapons for operational objectives to defeat allied forces.

Of the three scenarios, this one would clearly put the most pressure on US extended deterrence. While US nuclear weapons would likely play an increasingly prominent role in extended deterrence, as North Korea builds a larger and more capable arsenal, this scenario would be the most likely—but not necessarily the only—one to prompt reconsideration of US nuclear requirements and force posture in the region to ensure escalation dominance for extended deterrence purposes and the ability to quickly defeat a range of North Korean nuclear threats, if needed.

How the different scenarios might affect US assurance challenges in the region is more difficult to calculate. Analysts often reference Lord Denis Healey, the United Kingdom's defense secretary from 1964 to 1970, to highlight the difficulties of assurance. During the Cold War, he wrote that “it takes only 5% credibility of American retaliation to deter the Russians, but 95% to reassure the Europeans.”⁵⁹ The requirements for assurance and extended deterrence may differ markedly. Allies can request resources for the purposes of assurance that are much greater than the resources that are thought to be necessary for deterrence.⁶⁰ Nonetheless, for allies that face an immediate existential threat, like a North Korea that is armed with an increasingly capable and destructive nuclear arsenal, the failure of the United States to address their concerns can lead to serious questions about the value of US security commitments and their exploration of alternatives that are not necessarily in US interests.

It would be reasonable to expect the security-related requests from US allies in East Asia to grow as North Korea's nuclear arsenal increases. David Santoro and John Warden point out the overarching assurance challenge looking forward when they write that the United States will need to “balance its desire to reduce allied anxiety against other interests. There are some allied interests that the United States—rightly—does not deem worthy of risking war. But if the gap between the United States and its allies becomes too large, allies will lose faith in US assurance, which could have disruptive consequences.”⁶¹ Striking the right assurance balance would be increasingly important if and when allies develop independent policies and capabilities to cope with conflict below the apparent threshold for US action or to augment US deterrence in the progressively dangerous scenarios posited above.

Allies are already seeking greater assurances that the United States has the offensive and defensive capabilities and resolve to promptly respond to and defeat North Korea's nuclear threats against them. This demand signal is only likely to grow, starting with the first scenario discussed above, but with increasing resonance for the second and third scenarios, potentially

⁵⁹ Denis Healey, *The Time of My Life* (London: Michael Joseph, 1989), p. 243.

⁶⁰ For a useful summary of this challenge, see Justin V. Anderson and Jeffrey A. Larsen with Polly M. Holdorf, “Extended Deterrence and Allied Assurance: Key Concepts and Current Challenges for US Policy,” *INSS Occasional Paper*; US Air Force Institute for National Security Studies, September 2013.

⁶¹ David Santoro and John K. Warden, “Assuring Japan and South Korea in the Second Nuclear Age,” *Washington Quarterly* 38, no. 1 (2015), p. 149.

including requests for the United States to forward deploy so-called tactical nuclear forces. Calls would also likely become louder for either increases in the US conventional force posture or US support for allies to develop independent capabilities to address the prospect of provocations from an emboldened North Korea. Accordingly, US allies could be expected to request deeper policy coordination as well as joint planning, potentially on US nuclear matters. Lastly, allies would increasingly look for signs of political resolve from US leaders, such as presidential affirmations of the US commitment to defend allies against nuclear threats and coercion, but there could also be heightened requests for a more explicit US declaratory statement should North Korea use nuclear weapons.

Conclusion

If North Korea continues to grow its nuclear arsenal in terms of both quantity and quality, the pressures on US extended deterrence will surely mount. The size, shape and character of its arsenal will have consequences for the types of challenges and risks that we will face. It will also impact the type of assurances allies seek from the United States and what the United States will ask of its allies in the future. Meeting those demands will have both political and financial costs that could come at the expense of other domestic, regional and global priorities. How the United States and its East Asian allies manage those interests and whether they respond effectively to the deterrence challenges of an evolving North Korean nuclear threat will have far-reaching consequences for the US rebalance strategy and for geostrategic relations in the region more broadly.

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1717 Massachusetts Avenue NW, 6th Fl
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BRADLEY O. BABSON

DECEMBER 2015

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NUCLEAR FUTURES SERIES

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Bradley O. Babson is a Consultant on Asian affairs with a present concentration on North Korea. He worked for the World Bank for 26 years before retiring in 2000. Most of his World Bank career was spent working on East Asia and Southeast Asia, where he led a regional office based in Bangkok and opened the resident office in Hanoi, Vietnam in the early 1990s. Since 2000, he has consulted for the World Bank and United Nations and has been involved in projects sponsored by various institutes, foundations and universities. He is presently Chair of the DPRK Economic Forum at the US-Korea Institute, Johns Hopkins School of Advanced International Studies, and serves on the Advisory Council of the Korea Economic Institute of America and Steering Committee of the National Committee for North Korea. He has written widely on the North Korean economy, most recently as a contributor to 38 North. In Maine, he is President of the Brunswick-Topsham Land Trust. Mr. Babson received his BA from Williams College in 1972, and MPA from the Woodrow Wilson School of International and Public Affairs at Princeton University in 1974. He lives in Brunswick, Maine.

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POSITIVE ECONOMIC INDUCEMENTS IN FUTURE NUCLEAR NEGOTIATIONS WITH NORTH KOREA

Any future negotiations with North Korea will need to consider the role of economic incentives and rewards for making progress in meeting US goals of reducing Pyongyang's nuclear weapons capabilities and risk of proliferation. This will require shaping a nuanced balance between the role of measures to maintain pressure to negotiate versus incentives and rewards that are meaningful to the North Koreans and have traction in the negotiations process. Changes in North Korea's economic circumstances, external relations environment and domestic political context in recent years need to be taken into account when designing a strategy that relates to current North Korean leadership interests and challenges. Doing so will increase the chances of new negotiations being more successful in meeting US goals than previous efforts. This paper explores considerations for selecting positive inducements that will support a negotiation strategy that leads to a sustainable political solution to North Korea's nuclear threats and that will position North Korea to pursue its economic future in ways that are compatible with reduced isolation and increased integration with the international community.

Guiding Principles

Any new negotiation process with North Korea should be anchored in an expectation that ***North Korea will negotiate in good faith only if it believes this will result in an improvement in its overall security interests.*** Negotiating with an expectation of eventual regime collapse or subjugation, such as by buying time for other dynamics of change to undermine regime security, will not give North Korea the confidence to negotiate in good faith and deliver on agreed actions. North Korea's essential security interests have not changed fundamentally since the Korean War, but the international and domestic context for protecting these interests has changed dramatically. In recent years, South Korean economic and political relations with China have blossomed, international sanctions have importantly—but only partially—curtailed North Korea's ability to pursue its economic aspirations and the North Korean people are more aware of their growing freedom to pursue their own interests through an expanding market economy despite continuing social control efforts by the state. An appreciation of these changing circumstances affecting the regime's overall security calculus will help identify inducements that will resonate with the North Korean negotiators.

Economic security is an essential component of overall national security. In the present context, any negotiation strategy with North Korea should take into account that North Korea will seek to enhance its longer-term economic security interests, not just relief for immediate

humanitarian and economic needs. While Kim Jong Un is a young and relatively inexperienced leader, he is future-oriented and committed to seeking new ways to pursue economic development. The generational shift in leadership underway across North Korean society has been significantly affected by the famine of the 1990s, growing the role of markets and increasing knowledge of the outside world. Thus, it should be expected that North Korea will seek meaningful measures to advance sustainable economic development in future negotiations.

A corollary of this principle is that *any commitments to financial aid or investment as part of a negotiation should be evaluated from the perspective of how this would contribute toward improving North Korea's longer-term security interests in an economically rational way.*

The light water reactor (LWR) project under the Agreed Framework, under which the United States agreed to facilitate the building of two 1,000 megawatt LWRs, did not meet this test. At that time, the economic logic of the Agreed Framework was less meaningful to the North Koreans than establishing a mechanism to sustain an active relationship with the United States. As a result, the lack of inclusion in the project of improvements to the power distribution grid that were essential to being able to place the LWRs in service, absence of a coherent overall energy development plan within which the LWRs would have a clearly defined place, and inattention to energy pricing policies and issues related to operation and maintenance meant that the LWR project would not realistically help alleviate North Korea's electricity needs. This lack of economic rationality would have eventually threatened the sustainability of the political achievements in constraining the nuclear weapons program. As it was, the Agreed Framework collapsed in 2002 after the disclosure of a secret uranium enrichment program. Heavy fuel oil provided under both the Agreed Framework and Six Party Talks was intended to alleviate shortages of coal due to North Korean difficulties in reopening flooded coal mines. Similarly, the Six Party Talks agreement to provide equipment from lists prepared by the North Koreans for rehabilitation of hydropower power stations was not based on a transparent, technically and economically evaluated plan, nor was it substantial enough to have a major impact on alleviating North Korea's energy deficiencies. North Korean negotiators may or may not have understood the implications of the economic value of the agreements they reached, but ultimately, the potential benefit to the economy was questionable. Future negotiations that include economic rewards should ensure that the underlying economic rationale and requirements for successful and sustainable negotiations are addressed.

A final basic principle for positive economic inducements (as well as pressure measures) is to *seek multilateral support for them.* The past 20 years have made clear that the national interests of North Korea's neighbors and primary economic partners do not coincide. Policies on economic engagement with North Korea have been fractured and incompatible. The absence of a coherent policy for how to use economic relations and incentives to advance the denuclearization of North Korea have been a source of frustration for all major parties that North Korea has exploited in pursuing its own interests. A future negotiations strategy will need to accept this reality and be grounded in efforts to expand common ground while acknowledging limitations imposed by competing national interests.¹

¹ For a more detailed discussion of these dynamics, see Bradley Babson, "Dilemmas of Financial Engagement with North Korea," 38 *North*, March 26, 2015, <http://38north.org/2015/03/bbabson032615/>.

Considerations in Designing Positive Economic Inducements

A number of considerations are important for shaping a future strategy of using positive economic inducements in nuclear negotiations with North Korea. These concern both North Korea's motivations to accept such inducements and its willingness to deliver on commitments.

Humanitarian Aid for Vulnerable Groups

While the humanitarian needs of North Korea have figured prominently in US-DPRK relations from the onset of the famine in the mid-1990s, neither the Agreed Framework nor Six Party Talks agreements included humanitarian aid as a formal component. Humanitarian aid was considered a parallel framework for engagement that would improve the environment for progress on the nuclear front but it was not conditioned on progress. As North Korea slowly recovered from the depths of the famine era and deterioration of cooperation on the nuclear issues with the collapse of the Agreed Framework in 2002, donor fatigue led to a significant reduction of humanitarian aid from the United States as well as from the international community more generally. The initiative to reinvigorate a nuclear dialogue by proposing a US humanitarian assistance program under the so-called Leap Day agreement in 2012 failed when North Korea pulled back from the deal and launched a satellite. This failure can be viewed in part as the unwillingness of the United States to put a more substantial incentive on the table in a changing domestic context in North Korea. Offering humanitarian aid is more palatable for the United States than outright economic assistance. However, from the North Korean perspective, it reinforced an image of weakness in meeting social needs. At that time, Kim Jong Un was occupied primarily with regime transition and gaining support from the military establishment. He had also just made promises in his 2012 New Year's speech to improve the livelihood of all North Koreans. With expanded cross-border trade with China and most families meeting household needs in the growing market economy, risk of famine had receded. Thus, seeking support to address humanitarian needs has not been a high priority in North Korea's external relations in recent years. An agreement to provide modest humanitarian aid in exchange for a moratorium on nuclear and missile tests was not incentive enough to overcome domestic political considerations. Any future strategy to provide positive inducements related to the nuclear program will need to be more robust.

The “Byungjin” Policy: Two-pronged Commitment to Pursuing Both Nuclear Development and Economic Development

In April 2013, Kim Jong Un announced the adoption of the “byungjin” (parallel development) policy at a meeting of the Workers' Party Central Committee as a new strategic policy guideline.² While the policy of pursuing national defense and economic development in parallel is not new, and was followed both by Kim Il Sung and Kim Jong Il, the rearticulation by Kim Jong Un does represent an advance in concept. First, nuclear development is conceived as both maintaining national defense deterrence and using nuclear power peacefully for energy. Second, it includes the missile program and emphasizes commitment to the space program for

² A good summary of the policy and its implications is Cheon Seong-Whun, “The Kim Jong Un Regime's ‘Byungjin’ (Parallel Development) Policy of Economy and Nuclear Weapons and the April 1 ‘Nuclearization Law,’” Online Series CO 13-11, Korea Institute for Korean Unification, April 23, 2013, [http://www.kinu.or.kr/upload/neoboard/DATA01/co13-11\(E\).pdf](http://www.kinu.or.kr/upload/neoboard/DATA01/co13-11(E).pdf).

both military and peaceful purposes. Third, it reinforces the notion of North Korea becoming a “strong and prosperous nation where people can enjoy the wealth and splendor of socialism” by strengthening defense capacity and focusing on economic construction. It thus reinforces the high priority that Kim Jong Il has given economic development since his first New Year’s address in 2012.

One basic question is whether North Korea can further develop its nuclear and missile programs, while at the same time achieving significant progress in economic development. Recent US policy has been to try to deny North Korea the ability to achieve these ambitions by maintaining strong military deterrence, adding economic sanctions and seeking to persuade other parties to increase pressures on North Korea. Legislation in Congress could further ratchet economic pressure by expanding financial sanctions, although an executive order signed by President Barack Obama in December 2014 already provides the legal authority to apply further pressures.

There are two aspects to consider from an economic perspective when shaping a future nuclear strategy in the context of the *byungjin* policy. The first is whether pressure alone can deny North Korea the ability to develop its nuclear program and simultaneously improve its economy. The second is how to balance military and peaceful uses of nuclear and missile capabilities in a way that might be acceptable to both sides in a negotiation.

As for the first aspect, there are good reasons to be skeptical that pressure alone can deny North Korea the ability to both develop its nuclear program and improve its economy. One is that China, South Korea and Russia each have interests that make it unlikely they would adhere to a policy that applies sufficient economic and financial pressure on North Korea in a coordinated way to force Pyongyang’s acquiescence on its nuclear program.

Despite increasing Chinese dissatisfaction with North Korea, it is unlikely that China would agree to endorse economic pressures that would risk either regime collapse or large-scale refugee flows into China. In fact, China is seeking to change North Korea from within through its economic engagement policies. South Korea has a long-term interest in maintaining stability on the Korean peninsula, improving inter-Korean relations where possible and pursuing a strategy to support improvements in the North Korean economy that would lessen the economic costs of eventual unification. Russia, meanwhile, is seeking to enhance its influence in North Korean affairs through cross-border cooperation, not pressure. And given the current state of US-Russian relations and Moscow’s desire to be an active player in security and economic engagement with both Koreas, if the United States seeks more cooperation to pressure North Korea, Russia would likely do the opposite and bolster economic support for Pyongyang.

Another factor to consider regarding North Korea’s ability to develop its nuclear program as well as its economy is the impact of North Korean domestic economic policy and initiatives. Under Kim Jong Un, North Korea is pursuing two tracks to improve its economy. One is to promote import substitution to reduce needs for foreign exchange for domestic industries and consumption of consumer goods. The other is to seek productivity gains in domestic production. The priority means are advances in the application of science and technology in various sectors; changes in agriculture policy and management to reduce size of production units and increase incentives to produce for personal profit through sales to markets; and the decentralization of

decision making in enterprises to allow for more productive use of labor and capital. There are also signs of new initiatives to bring money accumulated in market economic activities into the banking system. These initiatives could lead to a more efficient allocation of domestic savings for productive investment. While modest, these new initiatives for “economic management in our own style” are likely to result in meaningful gains in the use of domestic resources for economic development.

In addition to the potential of these state-sponsored initiatives, the continuing growth of the market economy and its role in providing jobs and improving the standard of living for North Korean people is having a positive impact on economic development. Altogether these developments have the potential to increase the productivity of capital and labor without external support. In light of the traction, however modest, that North Korea is experiencing in its internal economic development efforts and tolerances of the market, it is not surprising that the North Korean leadership is confident in its commitment to the *byungjin* policy and that it can achieve both goals involving the nuclear program and the economy.

The second aspect of the *byungjin* policy that is relevant for future negotiations on the nuclear program is the expansion of the concept of nuclear development to include peaceful as well as defensive activities. In a negotiation context, the North Koreans potentially could trade their nuclear weapons program for a combination of alternative ways to meet their national security needs and peaceful use of nuclear power. If the negotiation is artfully crafted, the North Koreans could claim that they are still following a *byungjin* policy, even if the internal content would be modified by the agreements reached.

This would also mean that the light water reactor idea could well reemerge as a component of the positive inducements in the negotiation. If this were the case then, in keeping with the principles discussed earlier, any new approach to cooperation on the development of the LWR agenda would need to be set in the context of an economically rational and technically sound energy development plan, with attention paid to the power grid and appropriate balance of nuclear and non-nuclear sources of electric power.

North Korean Vulnerabilities on Economic Development

Notwithstanding the discussion above on the prospects of North Korea developing both its nuclear program and its economy, an important perspective to consider for a future nuclear negotiation strategy is how to exploit North Korean economic vulnerabilities using positive inducements.

One powerful vulnerability is the fact that by publicly stating to the North Korean people in his first New Year’s address that they will never again have to tighten their belts, Kim Jong Un has tethered the perceived legitimacy of his regime to being able to deliver on this promise. Economic development that improves the lives of ordinary North Koreans and not just an inner elite in Pyongyang is a high priority. Kim Jong Un will have a strong incentive to seek opportunities to help him deliver on these expectations.

Another looming vulnerability is North Korea's extreme reliance on trade and investment from China. A slowdown in the Chinese economy will have a decidedly negative impact on the North Korean economy. There is already evidence that export earnings are declining because of lower commodity prices and slowing demand in China for North Korean raw materials, notably coal. While North Korea can be expected to intensify its self-reliance efforts, it is in Pyongyang's interest to diversify its external economic relations, especially with South Korea and Japan, but also with the Association of Southeast Asian Nations. This is likely to have an impact on North Korean diplomacy toward relations with these countries. Thus, linking improved economic relations with a number of important trade and potential investment partners with progress on the nuclear issues will have more traction in this environment than in recent years. This implies careful consultation and coordination, especially with South Korea and Japan, to build a multilaterally supported approach that provides positive economic inducements for a reinvigorated nuclear negotiation process.

A long-standing vulnerability is North Korea's energy needs. The availability of electric power continues to be a major problem. While North Korea has ample coal reserves, it does not have the capital or technology to invest in new-generation power plants. While efforts are being made to rehabilitate and expand hydropower resources, progress has been slow, and hydropower is itself vulnerable to freezing temperatures in winter. Helping North Korea address its energy needs was a central inducement in both the Agreed Framework and the Six Party Talks and can be expected to be a priority area in any future nuclear negotiation.

Opportunities to Exploit with Positive Inducements

Evolving Economic Rhetoric and Policy. Kim Jong Un has given the cabinet a lead role in economic development strategy and policymaking, turning away from Kim Jong Il's reliance on leadership from the Workers' Party that led to the failed currency reform and effort to eliminate the growing market economy in late 2009 and early 2010. While North Korea has now embarked on a policy of introducing "improvements in the economic management in our own style," these cannot be considered comprehensive and coherent economic reforms. The evolution of rhetoric in official media, foreign press interviews and diplomatic talking points demonstrates shifts in orientation and policy evolution from the closing days of the Kim Jong Il era. Therefore, it should not be assumed that North Korean thinking and willingness to talk about substantive economic issues will be as constrained in future nuclear negotiations as they were in previous ones. Talk is now quite open about how to attract investment in Special Enterprise Zones, make changes in agriculture under the "pojun" policy³ and decentralize enterprise management. There are also indications that the Ministry of Finance and the Central Bank are being given leeway to move forward with financial system innovations that would mobilize private savings for economic development and bring the banking system closer into compliance with international standards.

Markets are officially tolerated and, in reality, North Korea is now a mixed economy with significant reliance on market economic activity in addition to state-directed activity. Many

³ The "pojun" policy is the policy of reducing the size of agricultural work units and allowing significantly more of their production to be retained for sale through markets than under the previous policy.

enterprises today have a foot firmly in both, even though the legal and financial systems in North Korea have not evolved in line with the expansion of the role of markets. Despite these realities, socialist rhetoric is dominant in the official media, and the role of markets has been ignored in all New Year's statements on economic progress and forward-looking policies. Also, while sales and the trading of assets (such as housing units) are active, official rhetoric and policy retain the view that the state owns all assets and ignore the growing reality on the ground. Widespread corruption is usurping the space normally filled by a legal and financial system designed to accommodate private ownership of assets and market transactions.

In this environment, there are potential hooks of positive developments that could be exploited in a future nuclear negotiation and also areas to avoid because of political sensitivities and policy gaps.

Sanctions. An important component of a positive inducement strategy for the nuclear program would be the removal of sanctions that constrain North Korea's ability to attract foreign direct investment, expand commercial trade and participate in a transparent, legally grounded international financial system. Such sanctions have led North Korea to adopt non-transparent methods of conducting international business and have distorted incentives for investment and trade by North Korea and its economic partners. Selective removal of sanctions would thus improve prospects for North Korea to pursue an outward-oriented economic development strategy and integration into the international financial system in ways that will serve its long-term economic security interests. In practical terms, bilateral sanctions would be easier to remove than multilateral sanctions, and there will be considerable resistance from the US government and Congress, as well as the United Nations Security Council, to removing sanctions prematurely. One option to consider is the suspension of sanctions where this is legally feasible, with full removal dependent on continuing progress on the nuclear agenda.

Special Enterprise Zones. The North Korean government is giving high priority to the development of Special Enterprise Zones (SEZs). In 2014, a line item for SEZs was added to the national budget approved by the Supreme People's Assembly. Laws that have been approved for the SEZs go a long way toward meeting international expectations on paper, though major obstacles exist to North Korea's ability to realize its ambitions for SEZs as an engine for economic growth and absorption of foreign capital and technology. Among these are risk perceptions of investors that are strongly influenced by North Korea's isolation, lack of standing in the international financial system and political and security risks. Another major obstacle is lack of funding for the infrastructure (such as power, water and telecommunications) that is required to attract investors to an SEZ. North Korean officials have reached out in foreign academic exchanges to gain advice on international experience in successful SEZs and expert opinions on their situation and efforts. This is a good sign of willingness to work with international expert advice on a high-priority economic topic. A negotiation that leads to an agreement on the nuclear program would significantly improve potential SEZ investors' political risk perceptions. These would be further improved if the positive inducements for reaching an agreement also include support for steps that would help North Korea move toward participation in the international financial system and funding for infrastructure investments in high-priority SEZs that have significant economic potential.

Agriculture. North Korea's priority focus on improving agricultural productivity through the new field management system provides an opportunity for tangible assistance to help overcome some of the obstacles it is experiencing in implementing the new approach. The reduction in both the number of people in the work units and the size of land plots that is accompanying the breakup of the large-scale cooperative farms revealed two major issues. One is how to provide a large number of field units with equipment that is appropriate for the smaller plots of land. Instead of field units negotiating shared use of a small number of large tractors and other equipment used for the former cooperatives, it would be desirable to provide more small-sized tractors and harvesting equipment as is now prevalent in China. Similarly, technical expertise on the use of pesticides, new seed varieties and innovative management practices needs to be available to all field units that are operating independently. Previously, experts at the larger cooperative level provided this knowledge for the cooperative as a whole. What farmers now need is a system for obtaining up-to-date technical knowledge through a restructured extension service. Technical assistance and training to build such new knowledge delivery systems to support the agricultural management policy would be one area where international support could be helpful.

Energy. A future strategy for inducements to help overcome North Korea's energy vulnerabilities should be grounded in an economically and technically appropriate framework. Ideally, this should start with a collaborative assessment and formulation of a multiyear energy development strategy and plan that could underpin a program of evolving support for the plan in a future nuclear negotiation process. Early tangible support could focus on filling gaps in the hydropower rehabilitation needs and the existing program of building small-scale hydropower systems in rural areas; it could also meet local needs at the provincial level. Linkage to the local grid would also need to be included. Another possible focus could be on reducing energy losses by upgrading priority sections of the existing distribution network. A pilot program of community solar power development could also be considered. Larger projects that might be included as eventual rewards in the nuclear weapons agenda could include new conventional power generation plants using domestic coal with emission control technology and development of a LWR program for power that is rational in the overall power generation plan and complemented by necessary improvements in the distribution system. Funding for conventional power generation and distribution projects could be provided bilaterally or eventually multilaterally if and when North Korea becomes eligible for loans from international financial institutions, including the Asian Infrastructure Investment Bank. Simply resurrecting the Korean Peninsula Energy Development Organization (KEDO) is probably not a good idea, as it did not involve China or Russia, both of which would be necessary in a new arrangement—although an energy coordination group of some kind would be useful in view of the potential number of actors involved.

Money Laundering. In January 2015, North Korea announced that it had been granted observer status at the Asia/Pacific Group on Money Laundering (APG), linked to the Financial Action Task Force (FATF) of the Organization for Economic Cooperation and Development. North Korea has attended meetings of the APG for several years and has signaled its desire to become an observer. Being granted observer status under APG will give the North Korean financial authorities access to technical guidance from the APG Secretariat to make the legal and organizational improvements needed to work toward meeting membership requirements. This

development is significant because for the first time, North Korea will be working with outside financial experts in a disciplined process to make important changes in its financial system management that would be recognized as meeting international standards.

It is also noteworthy that the Central Bank president said in an interview that the effort to come into compliance with APG requirements was being coordinated by a national committee. This committee is chaired by a deputy premier of the cabinet and includes officials from the Central Bank, Foreign Ministry and Finance Ministry, as well as law enforcement authorities.⁴ This signals high-level attention and support for this initiative, as well as a meaningful effort to integrate different parts of the North Korean bureaucracy in the various measures that are necessary to succeed.

How the APG process unfolds will provide North Korean financial authorities with experience working with foreign technical experts on changes in the financial system and its management. It will test the political will of the North Korean leadership to accept the legal and transparency requirements they will need to adopt to achieve eventual membership status. It will also be a test of whether cross-agency cooperation and coordination can be effectively managed in a high-profile undertaking of this type. It is noteworthy that Cuba undertook a similar process while still under US sanctions and is now in compliance with FATF standards. The example of Cuba is a good model for North Korea and one that could be encouraged if one important objective of financial and economic engagement with North Korea is to find ways to help Pyongyang integrate in appropriate ways with the international system of financial relations based on non-political criteria and performance in meeting standards.

Support for helping North Korea meet its commitment to comply with FATF standards could be a possible area for inclusion in a positive inducement strategy on the nuclear program. This would reinforce the objective of helping North Korea achieve more stable long-term economic security through disciplined integration in the international financial system.

Asian Infrastructure Investment Bank (AIIB). The establishment of the AIIB in June 2015 provides an opening for a new dynamic of economic engagement with North Korea. While North Korea's overture to become a founding member was rejected by China (the sponsoring country), the potential for AIIB to play a significant role in North Korea's economic future is a consideration that could be exploited in a positive inducement strategy for the nuclear program. The fact that the United States and Japan are not founding members could initially make it easier for North Korea to make concessions that might pave the way toward membership and eventual investments. Such an approach would require multilateral support, but could proceed in a gradual, phased way.⁵

This could begin by supporting observer status for North Korea within the AIIB. Such a step would allow North Korea to learn how the AIIB conducts normal business and why the bank adopts particular governance policies and operational procedures. A supplementary technical

⁴ "N. Korea launched anti-money laundering body," *The Korea Herald*, February 3, 2015.

⁵ For a more detailed discussion see Bradley Babson, "Could the New Asian Infrastructure Investment Bank Change the Dynamics of Economic Engagement with North Korea?" *38 North*, May 26, 2015, <http://38north.org/2015/05/bbabson052515/>.

assistance program could help the North Korean government address policy and capacity obstacles to its eventual membership in a step-by-step manner.

A second phase could aim to build confidence in developing an operational relationship between North Korea and the bank, both by helping Pyongyang prepare projects for potential financing and by funding some smaller North Korean initiatives with grants. Membership and access to loan financing would come when North Korea satisfies all of the necessary technical and political conditions for AIIB membership, which include prior membership in the International Monetary Fund (IMF). These could be linked to specific stages in the implementation of a multilaterally supported nuclear agreement.

Advancing North Korea's regional integration through the AIIB would reward it with a meaningful economic incentive that could also help advance the cause of dealing with serious security challenges. By helping Pyongyang fund infrastructure that it badly needs for economic growth, the bank could help foster discussions in political talks on security issues—not just on nuclear issues, but also on other opportunities for multilateral cooperation in Northeast Asia—and potentially by creating greater economic interdependence with other state participants in AIIB programs.

Relations with the IMF and World Bank. In 1997, when North Korea was facing famine and economic collapse, it hosted an assessment mission from the IMF. This led to a report to the IMF Executive Board but no further advancement in relations, as the North Koreans signaled that, while they were interested in receiving technical and financial assistance, they were not prepared to accept IMF requirements for open reporting of national financial and economic statistics or be subject to conditionality for assistance. In early 1998, North Korea hosted an “exploratory” mission from the World Bank to learn more about its policies and ways of operating. In 2000, North Korea was informally consulted and then formally received an invitation to attend the annual meetings of the IMF and World Bank in Prague as a special guest.⁶ In the end, the North Koreans did not attend due to embarrassment of the treatment of their delegation en route to the earlier annual meeting of the United Nations General Assembly in New York.

In mid-2001, an informal meeting of IMF and World Bank officials took place in London under South Korean auspices to discuss the requirements and process for North Korean membership. Potential follow-up progress was disrupted by the events of 9/11 and suspended after the breakdown in the Agreed Framework in late 2002. While formal relations have not progressed, informal interactions between North Korean officials and those from the IMF and World Bank have taken place occasionally in the context of track 1.5 meetings (in diplomatic terms, meetings between official and private actors). North Korean academics now have access to the internet and frequently visit the websites of the international financial organizations (IFIs) in their research.⁷ North Korea has for many years been attracted to IFIs both for knowledge and financial resources, but it remains wary of the institutions' transparency requirements, influence over policies and political dominance by the United States.

⁶ The author was personally involved in these initiatives.

⁷ From the author's informal conversations in Pyongyang in 2013.

While North Korea has never been a member of the IMF or World Bank, Cuba was an early member of both organizations but withdrew in 1964 and 1960, respectively. With Cuba now normalizing relations with the United States, its reintegration in the international financial system is under active consideration. Should that occur, North Korea will be even more isolated in remaining outside the system. Similarly, Myanmar's recent transition from an isolated and sanctioned relationship with the international community to one broadly supported in its efforts to open up and reform has been accompanied by greatly needed support from both the IMF and World Bank. The IMF in particular has played a critical role in helping Myanmar establish credibility for its economic reforms, both internationally and domestically. To pursue its long-term economic security interests, access to technical assistance and a path for eventual membership in the IMF and World Bank would be a meaningful part of a positive inducement strategy for the nuclear program.

Strategy for Structuring a Positive Economic Inducement Plan

Sequencing. In approaching the task of constructing a plan that provides positive economic inducements, it is important to distinguish among three distinct phases:

1. *Pre-Agreement.* Items selected as overtures prior to reaching a nuclear agreement should help build trust and motivation to negotiate in good faith. These should be modest in scope, easy to deliver, attractive to North Korea and help Pyongyang move in desirable directions from the US perspective, even if other issues come up that delay or prevent reaching a nuclear agreement.
2. *Signing of an Agreement.* Items selected for delivery upon signing an agreement should provide tangible positive rewards for actions already taken, provide new incentives for proceeding with implementation of the agreement that can either be rescinded or halted if there is a delay or breakdown in the implementation plan, and form the platform for more expanded inducements dependent on progress during the implementation phase.
3. *Implementation of Agreement.* Items selected for delivery upon reaching key milestones during the implementation phase should provide substantial and not easily reversible benefits that are commensurate with actions taken on the agreed plan.

To sustain the achievements of the nuclear agreement, the ultimate objective is for North Korea to believe that its economic security interests have been significantly enhanced and that other measures have allowed the country to maintain its overall national security in an acceptable way.

Clustering. In considering options for specific items to include in a positive economic inducement plan, it is also useful to cluster possible actions in relation to specific objectives. Possible clusters from the considerations discussed earlier in this paper could include:

1. Meeting urgent high-priority social protection needs.
2. Improvements in economic management for improving livelihoods of ordinary people.

3. Support for expanding and diversifying foreign direct investment and commercial trade.
4. Support for integrating with the international financial system.
5. Support for capital investments in public infrastructure.

Specific items and their phasing should thus be framed within a matrix of these three phases and five clusters. Some items may be relevant for more than one cluster. Below are examples of how these could fit together (specific clusters enumerated).

Possible Measures for Phase 1: Trust Building and Incentives to Negotiate

- Provide targeted social protection support to vulnerable groups. (1)
- Offer to provide technical assistance and capacity building for development of a new knowledge distribution system for farmers. (2)
- Offer to collaborate on a technical review of energy needs and to prepare a plan to meet high-priority needs in hydropower, upgrade local power distribution systems and install community solar power systems in the provinces. (2, 5)
- Agree to consider a LWR for power generation as a possible part of a longer-term energy investment program subject to economic and technical justification. (5)
- Offer to provide support for technical preparation of infrastructure investment plans for high-priority SEZs. (3, 5)
- Agree to support North Korea for observer status at AIIB and special guest status at the IMF and World Bank. (4)
- Offer to provide support for technical collaboration on meeting APG requirements and national economic and financial statistics. (4)

Possible Measures for Phase 2: Value Linked to Real Progress and Future Commitments

- Expand targeted social protection support to vulnerable groups. (1)
- Provide a package of support for agricultural development including provision of small tractors and support for implementing new knowledge extension services to farmers. (2)
- Provide infrastructure (for example, power, water, waste, telecommunications and transport) for an agreed high-priority SEZ on a pilot basis. (3, 5)
- Provide a package of energy investments, including a high-priority program for rehabilitation of hydropower plants and the distribution system, small-scale rural and provincial hydropower projects and community solar power projects. (2, 5)

- Agree on whether a LWR or new conventional power generation capacity is a higher priority and take next steps for advancing technical preparation of the project and first phase investments. (5)
- Support IMF and World Bank technical assistance in economic management and financial system capacity building. (2, 4)
- Support AIIB technical assistance in infrastructure investment planning and project design. (2, 4, 5)
- Suspend selected sanctions to stimulate investor interest in SEZs and enable transparent financial transactions in keeping with APG requirements. (3, 4)

Possible Measures for Phase 3: Increased Value in Tandem with Implementation of Nuclear Agreement

- Continue targeted social protection support for vulnerable groups. (1)
- Support membership in the IMF, World Bank, Asian Development Bank and AIIB. (2)
- Provide infrastructure investment for priority viable SEZs. (3, 5)
- Provide support to a multi-donor energy investment program, including power generation (with or without a light water reactor), upgrading of the distribution network and an energy efficiency investment program. (3, 5)
- Provide support for an expanded agricultural development program. (2, 5)
- Remove sanctions that are no longer relevant to their original objectives. (1, 2, 3, 4, 5).

Conclusion

The changing internal and external context for any future serious nuclear negotiation with North Korea will require a new approach to providing inducements that will lead to more successful outcomes than previous negotiations. The priority now being given to economic development by the new generation leadership in North Korea provides a number of potentially attractive opportunities and measures to encourage and support a new nuclear negotiation. Elevating the economic dimension of the negotiations to a higher standard than was adopted in the past is worth exploring. In fact, it may be essential for achieving the political and security objectives of the United States and in bringing North Korea closer to integration in the international community in ways that will improve longer-term stability on the Korean peninsula.

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US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

Sanctions' Role in Dealing with the North Korean Problem

JOSEPH M. DETHOMAS

JANUARY 2016

A stylized map of North Korea is outlined in a bright blue line. The map is set against a dark blue background that features a series of concentric circles, resembling a radar screen or a target. The background also has a subtle pattern of lighter blue squares. The overall design is modern and thematic, focusing on the North Korean nuclear issue.

NORTH KOREA'S
NUCLEAR FUTURES SERIES

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Joseph M. DeThomas is a Professor of Practice in the School of International Affairs of the Pennsylvania State University. He served as US Ambassador to Estonia from 2001 to 2004, spent 29 years as a member of the US Foreign Service and 32 years in the US Department of State. His service abroad included tours in Austria, Ethiopia, Germany, Iran and Mexico. He also held numerous positions in Washington over the course of three decades. This included two years of service as Deputy Assistant Secretary of State for Non-Proliferation from 1999 to 2001 as well as a number of other positions that dealt primarily with proliferation-sensitive countries, including India, Iran, Iraq, North Korea and Pakistan.

Professor DeThomas served on the faculty of the National War College from 2004 to 2006. He received Meritorious and Superior Honor Awards for non-proliferation innovations, humanitarian contributions and management as well as a group award for valor for service in Tehran, Iran.

After retiring from government service in 2006, he directed international science engagement programs in more than 20 countries at CRDF Global.

He returned to service in the US Department of State from 2010 until February 2013 as an adviser. There, he worked primarily on Iran and North Korea, implementing sanctions and attempting to impede the weapons of mass destruction efforts of those two countries.

Professor DeThomas is also a distinguished graduate of the National War College.

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SANCTIONS' ROLE IN DEALING WITH THE NORTH KOREAN PROBLEM

Introduction

For almost a decade, sanctions have been the principal coercive instrument available to the United States and the international community in trying to deal with North Korea's nuclear weapons and long-range ballistic missile programs. As bilateral and multilateral negotiating tracks with the DPRK have withered, sanctions that were initially crafted to slow North Korean proliferation programs and steer Pyongyang toward a negotiated reversal of those programs now seem untethered from overall policy. Given the evolution of North Korean policy and the status of its proliferation programs, the current sanctions are inappropriate and overmatched. This is not to say sanctions have no role in dealing with the issue, but rather they must be put into the service of an overall strategy relevant to the realities of the region, particularly since, given the steady increase in the DPRK's nuclear capabilities, the next decade could lead to severe effects on vital US interests.

Sanctions Today: Hammers Without Nails

Since the Democratic People's Republic of Korea (DPRK or North Korea) conducted its first nuclear test in October 2006, sanctions have been the principal coercive tool available to the United States and the international community to press Pyongyang to reverse course. The negotiation and passage of a series of United Nations (UN) Security Council resolutions between 2006 and 2013 were no small accomplishments. And the evolution and sharpening of the sanctions effort in successive resolutions and presidential statements are a credit to the governments that took the lead in the effort.¹

Similarly, the United States government has demonstrated for an even longer time considerable persistence and creativity in creating sanctions pressure on Pyongyang. These national measures have occurred despite the fact that the United States had seemingly expended most of its economic leverage through a Korean War vintage set of economic embargos long ago. The United States managed to adapt its non-proliferation legislation, regulations, and operational capability in order to interdict illicit arms shipments and reduce North Korean export earnings in this field. In particular, it put into play new financial tools that had been developed for counterterrorism purposes post-September 11, 2001, in order to have a surprisingly large impact

¹ For an analysis of the sharpening of sanctions in successive resolutions and presidential statements, see Jina Kim, "UN Sanctions as an Instrument of Coercive Diplomacy against North Korea," *Korean Journal of Defense Analysis* 26, no. 3 (September 2014): 319–21.

on North Korean international financial flows.² The UN, US and other national sanctions have increased the costs to Pyongyang of its proliferation programs; they have punished North Korean and third-country brokers and financial enablers of those programs; and they have sent a signal to other potential proliferators that sanctions would impose real costs on them if they followed North Korea's example.

But no one can argue that the sanctions have been successful in preventing North Korea's nuclear future; this has been outlined in previous papers in *38 North's North Korea's Nuclear Futures Series*. It is not a matter of whether sanctions have operated effectively or whether all UN member states have fully implemented their obligations under the resolutions. Nor is it a matter of whether every sanctionable entity in the DPRK or elsewhere has been designated. Clearly, sanctions could have been more fully enforced, but this is not the core issue. This is not primarily a failure of will or execution by either the US administration or the international community as a whole.³ Rather, it is because the sanctions are not appropriate to the size of the policy objective they are supposed to achieve.

Whatever the case was 10 or 20 years ago, it is clear in 2015 that Pyongyang was pursuing a grand strategy that included reliance on nuclear weapons as reflected in the assertion of nuclear weapons status in the DPRK's constitution and the enunciation of the *byungjin* policy of parallel development of the national economy and a nuclear deterrent. It has committed significant resources to producing fissile material, testing nuclear weapons, fielding ballistic missile delivery systems, testing other possible delivery systems, creating a military command structure for nuclear forces, and enunciating a nuclear weapons doctrine.⁴

No country has taken so many steps down the nuclear weapons path and stepped back except for South Africa in the context of a fundamental shift in the nature of its society and its political architecture. While the regime in Pyongyang is capable of remarkable strategic gymnastics when the top leadership is so motivated, it would take a great deal more impetus than current sanctions to effect a strategic shift of such magnitude.

Moreover, the sanctions currently in place are not designed for such a heavy strategic burden. The basic strategic assumption behind the sanctions was that a marginal negative shift in the balance of costs of the North Korean nuclear program compared with what Pyongyang could gain from negotiating it away would be sufficient to compel a change in North Korean nuclear policy. Thus, sanctions were targeted rather than being general in nature.

The post-test sanctions imposed by the UN Security Council were primarily intended to increase the economic and political costs of the nuclear and missile programs and key elements of the regime as well as to impede access to outside assistance or financing for the nuclear and missile

² Juan C. Zarate, "Harnessing the Financial Furies: Smart Financial Power and National Security," *Washington Quarterly* 32, no. 4 (October 2009): 49–51.

³ For a less charitable view of sanctions implementation, see Claudia Rosett, "The Unbearable Lightness of UN Sanctions on North Korea," *Forbes.com*, October 30, 2015, <http://www.forbes.com/sites/claudiarosett/2015/10/30/the-unbearable-lightness-of-un-sanctions-on-north-korea/>.

⁴ Joseph S. Bermudez Jr., "North Korea's Development of a Nuclear Weapons Strategy," US-Korea Institute at SAIS, August 2015; Shane Smith, "North Korea's Evolving Nuclear Strategy," US-Korea Institute at SAIS, August 2015.

programs. In addition, certain US sanctions were intended to halt illicit DPRK activities and to preserve the global financial system from contamination by those illicit activities. While those US financial actions had second-order effects on the broader DPRK international financial sector, the sanctions were never broad enough or powerful enough to be regime threatening.

First, only full Chinese commitment to strong sanctions on key economic lifelines of the North Korean economy could promise such an effect, and a willing Chinese commitment to such steps is unlikely. If mishandled, coerced Chinese cooperation through secondary US sanctions is a highly risky enterprise with serious implications for global economic security. But if the North Korean program is fundamental to its national strategy, only sanctions seen as regime threatening may be sufficient to compel policy change.

Second, both the nature of the DPRK proliferation programs and the outside world's knowledge of their sources of technology and financing limited the impact of the targeted sanctions. The United States and other countries could cause delays, create financial discomfort and harass the North Korean efforts, but halting programs that are still largely opaque to Western intelligence and not heavily reliant on outside support through sanctions enforcement was never in the cards.

Third, the fundamental assumption behind the internationally accepted sanctions approach was the existence of a diplomatic track in which the DPRK could bargain away at least some aspects of its strategic programs in return for other political, economic and security objectives it wished to obtain from the participants of the Six Party Talks (the United States, Japan, Russia and China in addition to the ROK and DPRK). Using sanctions to slow the North Korean program and to increase its costs made sense if a diplomatic solution was at least a medium-term prospect. But since the collapse of the 2012 Leap Day deal, the negotiating track has been moribund. Even if Washington could now be persuaded to risk another attempt at reviving the process, Pyongyang's programs are creating a reality far removed from that goal.

The current sanctions regime for North Korea, therefore, is the diplomatic equivalent of a hammer without nails. Without the necessary supporting elements, a hammer can make noise and even do damage, but it cannot do much constructive work. This is not to say sanctions are useless. They clearly have a role in delegitimizing the North Korean nuclear and missile programs and in denying them outside assistance. They also provide mechanisms to help cope with outward proliferation from North Korea. They just cannot be the sole tool used to cope with a new strategic context—one in which North Korea is deeply wedded to a nuclear deterrent strategy. Unless a means were to be found to persuade China to be far more enthusiastic about upping sanctions pressure on Pyongyang, a new role for sanctions has to be developed for a new strategic context.

The Strategic Context

Previous papers in the North Korea's Nuclear Future Series have outlined the strategic context with regard to Pyongyang's capabilities and its probable intent. North Korea's nuclear and missile capabilities will grow,⁵ and it intends to use those capabilities at minimum to achieve

⁵ See Joel S. Wit and Sun Young Ahn, "North Korea's Nuclear Futures: Technology and Strategy," US-Korea Institute at SAIS, February 2015.

assured strategic deterrence against potential attackers and possibly pursue higher cost and higher risk nuclear war fighting strategies.⁶ The central strategic fact that will confront those wishing to deal with this issue over the next five years is that the DPRK will be walking down the always dangerous path of fielding a strategic nuclear force in an already heavily nuclearized and militarized environment. Because it does not yet have a capability to strike the United States with its nuclear forces, Pyongyang will probably feel that its ability to deter the US is not foolproof during the next few years. This could be a period of risk.

Historically, the first result of the introduction of nuclear weapons by a strategically weaker party has not been stability; it has been a spike in adventurism and in the possibility of nuclear war. Both the weaker and stronger parties can be prone to this syndrome. This was the case with Nikita Khrushchev's bombast and risk taking as the Soviet premier fielded his fledgling intercontinental ballistic missile (ICBM) force in the late 1950s and 1960s only to face annihilation when the Kennedy administration reacted to his ill-conceived effort to deter a potential American invasion of Cuba by covertly introducing nuclear-armed missiles there. It nearly was the case when China fielded its nuclear forces. The United States proposed a preemptive attack on Chinese nuclear capabilities to the Soviet Union in 1963; it also seriously considered providing India with nuclear weapons to counterbalance China.⁷ While the Soviets rejected Washington's feelers about preempting the Chinese nuclear program as its border dispute with the People's Republic of China (PRC) heated up in 1969, it made a very serious proposal to Washington to attack Chinese nuclear facilities. The proposal was quickly rejected.⁸

Recent efforts to introduce nuclear deterrence into tense environments have been similarly risky. The initial aftermath of the 1998 nuclear tests by both India and Pakistan was a sharp increase in confrontation. Pakistan initiated a military confrontation at Kargil in 1999, which was seen by many experts in and out of the US government as being responsible for two terrorist attacks that brought India and Pakistan to the brink of war in 2002. In both cases, nuclear threats were made quite explicit. It is likely that US intervention was instrumental in preventing one or both of those crises from erupting into general war between the two countries. Whether Saddam Hussein's nearly suicidal attempt to deter Iran with phantom weapons of mass destruction was a major factor in the US decision to invade Iraq in 2003 is probably a matter of conjecture, but it certainly did little to stabilize a deeply unstable situation.

There is logic to this. New entries in the nuclear arena are almost always vulnerable entities. Appearing to be less than serene and more than willing to pull the trigger in order to create doubt in the mind of a strategically superior opponent is consistent with the theory of deterrence as well as its practice.⁹ Pyongyang has decades of experience with this method of deterrence, although the North also has considerable experience in "dancing on the edge" of crisis and pulling back from the brink in time. That skill in managing crisis could continue. But it is also not

⁶ Bermudez, 12–15; Smith, 9, 14–19.

⁷ Francis J. Gavin, *Nuclear Statecraft: History and Strategy in America's Atomic Age* (Ithaca, NY: Cornell University Press, 2012), 78; George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Oakland, University of California Press, 1999), 90–93.

⁸ Lorenz M. Luthi, "Restoring Chaos to History: Sino-Soviet-American Relations, 1969," *China Quarterly* 210 (June 2012): 390–91.

⁹ Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 2008), 36–43.

impossible to imagine that the DPRK will be even freer with nuclear threats and perhaps even more provocative in its behavior as it fleshes out a deterrent force. If that proves to be the case, a provocation involving nuclear weapons could draw reactions vastly different than there have been to incidents involving a few landmines, artillery shells or torpedoes.

One additional component seems to coincide with the early stages of creation of a nuclear deterrent: outward proliferation. The United States, USSR, China, France, Israel and Pakistan all flirted with and in many cases consummated arrangements with other nations interested in acquiring nuclear weapons. To be sure, with the exception of Pakistan, all of these flirtations were in a different era before the nonproliferation regime was fully formed. But given the case of the al-Kibar reactor in Syria, Pyongyang's contempt for the Nuclear Non-proliferation Treaty (NPT), and the regime's long history of profiting from sales of surplus strategic goods and weapons once its own needs are met, the possibility of a North Korean role in the sale of a nuclear weapon or a large quantity of weapons-grade fissile material to another government or a terrorist group is likely to become more probable rather than less. This is especially the case if the regime believes its own strategic programs can shield it from a US response.

On the other side of the equation, a strategic consensus on how to proceed with North Korea does not seem more likely today than it has been over the past decade. While Washington continues to press Beijing to take a tough line and there is no love lost between the Chinese and North Korean leaderships, it seems unlikely that China will acquiesce in, let alone press for, sanctions or other steps that would destabilize Kim Jong Un's regime. Nevertheless, Washington's continued dialogue with the PRC leadership remains vital if only because there may come a more difficult time in the North Korean nuclear future when Beijing is looking for more far-reaching options.

The ROK and Japan clearly are prepared to put some pressure on the DPRK, but it is hard to predict how they will respond to a much more explicit nuclear weapons-based North Korean diplomacy and strategy. Denial of this unpleasant reality is very likely to be a first response. As the United States considers how it will respond to this North Korean strategy, it will have to consult closely with these parties. The US should not be surprised to discover that there might be severe differences in perspective. One obvious reason for this gap will be that, unlike the United States, Seoul and Tokyo are vulnerable today to a North Korean nuclear attack should deterrence fail.

A final element of strategic context is that diplomacy is not impossible in this new environment, but it is going to take a great deal of flexibility and creativity to come up with an agenda and format that can be productive. In particular, Washington will have to find a way to look at the harder realities of nuclear deterrence on the Korean peninsula while simultaneously seeking to open a channel in which to deal with those realities diplomatically.

In reality, the prospect of true denuclearization is very unlikely. Diplomatically, however, it is likely that the US, ROK, Japan and China will wish to keep the corpse of the objective propped up indefinitely. It is too important politically and in terms of global and regional nonproliferation objectives for those parties to drop it. But if the negotiating parties fall into zombie diplomacy (that is, the pursuit of long-dead, unachievable objectives at the expense of important interim goals), it will be difficult to revive a diplomatic track.

As the Korean peninsula enters into a period of significant nuclear danger, it is more important than ever to find means to limit the threat, to communicate strategic redlines and to flag steps that any of the parties might find so threatening as to cause war. Finding a forum, format and agenda that will permit the parties to constrain nuclear developments on the peninsula without giving up on the ultimate objective of denuclearization should be the first task before the Six Parties or any other group formed for the purpose of reviving a diplomatic track.

The Response

This new strategic reality requires a new policy. While sanctions have become a rote response to any North Korean action, it is time for a fundamental rethinking of this approach. The first item to consider is the objectives of the United States and other interested governments, then to discuss what instruments are available to permit them to achieve those objectives. It is only through such a process that the role sanctions should play going forward can be determined. It is a process that the US government has not pursued seriously for at least five years. Since this paper is designed primarily to focus on the sanctions component of a future policy, elements of a strategic response will be mentioned only cursorily and will be left to others who are better placed and more qualified to consider it in detail.

Possible Objectives

1. *Regime change.* The most extreme, ambitious and risky end would be eliminating the problem by eliminating the Kim regime. While not impossible to imagine this scenario either militarily or by means short of war, it is, however, not feasible to implement on any level—militarily, politically, economically or diplomatically—at a cost that any rational leadership in Seoul, Washington, Tokyo or Beijing would consider today. It is not that the North Korean state is impossible to kill; it is simply too expensive in military, monetary and human terms given what the parties would gain.
2. *Detering the worst.* However, regime-ending methods need to be considered in order to support more modest ends. North Korea's choice for nuclear deterrence as a core national security doctrine raises the risks to the US and its allies if peace cannot be maintained on the peninsula. Pyongyang will need to understand that regime elimination could be the US response to certain highly threatening steps it takes. Regime elimination is not a new reality on the peninsula. For many years, US conventional war plans have had the military defeat and occupation of North Korea as their objective should deterrence fail. Pyongyang is well aware of this. But, as North Korea builds out its nuclear forces, new actions could be seen as so threatening to US, allied or even Chinese vital interests as to merit such a draconian response. Among the steps that might merit such a reaction would be the transfer of nuclear weapons to terrorists or any use of nuclear weapons, even in some sort of limited scenario (for example, use of a tactical weapon against a US or ROK ship). At the same time, the means to regime ending would have to be reconsidered in a nuclear environment. Sanctions could play a role here.
3. *Deterrence on terms favorable to the United States and its allies.* The United States in particular will need to consider how to achieve this objective before it pursues any of the other components of a North Korea strategy. What military steps will best ensure peace

in the new nuclear environment? What steps either prevent North Korean use of nuclear weapons or defeat the DPRK with the least damage to the United States and its allies if they do use nuclear weapons? How will those steps be received not only by Pyongyang but also by Seoul, Tokyo and Beijing? Sanctions have a very small role to play here. First and foremost, the US administration will need to get back into the habit of thinking about nuclear deterrence, a topic for which it has no appetite and for which much of the expertise has long since departed government. Given the Obama administration's laudable efforts to deemphasize nuclear weapons in US national security policy, this is a sad moment. However, nuclear war must be put back on the menu if Kim Jong Un is ever to learn the hard facts about the choices he has made.

While it relearns the subject, the United States will have to unlearn many of the lessons it gained from the Cold War. North Korea is not the USSR, and it never will be. Even if the DPRK achieves the most optimistic levels of nuclear capability described in the Nuclear Futures papers, it will be a weak nation with primitive strategic forces and even more primitive early warning and command and control capabilities. The lessons of mutually assured destruction may not apply to North Korea. Any serious application of US strategic war fighting capability will result in unilateral assured destruction for North Korea. As with the conventional situation on the peninsula, this does not make the cost of war palatable, but it does make certain how a war would end. A deadly serious effort to think about the unthinkable of nuclear war on the peninsula could well result in the creation of a mix of weapons deployment and doctrine that could greatly reduce the cost of war to the United States and its allies and make strategic deterrence appear far less attractive to Pyongyang. This is, however, a two-edged sword. It will take great skill and care to ensure that this sort of military planning and related diplomacy does not force Pyongyang into panicked precipitate action, create a dynamic that impels the DPRK to increase its nuclear efforts, or cause a backlash among US allies or the Chinese.

4. *Containing the program.* Short of denuclearization, North Korea could take a number of steps to contain its program. The most obvious would be capping the program in terms of overall size, capability, or both. In theory, this could be a rich area for a diplomatic track to pursue. Ideally the process could resemble the P5+1 negotiations with Iran in which China, France, Russia, the United Kingdom and the United States plus Germany, traded sanctions relief for specific steps by Iran to cut back its nuclear program. Among the limiting steps that might merit sanctions relief could be a nuclear test moratorium; a ban or constraints on long-range missile testing; caps on fissile material production; and limitations on types of delivery means (for example, halting development of sea-based or tactical systems).

However, a number of obstacles exist. Most of the mechanisms for capping nuclear programs that other nuclear powers have taken could be antithetical to a closed regime like North Korea since they would require inspections. Given Pyongyang's past behavior, steps that it could take to cap the program (such as limiting fissile material production) would not be believed in the West absent of verification. Beyond the obvious reluctance of anyone in Washington to be exposed to another round of charges of being duped by Pyongyang, this approach will, at best, leave denuclearization to a distant and undefined

future time. It will be difficult to pursue this path without giving North Korea what it wants—diplomatic treatment as a nuclear weapons state with status equal to that of the recognized nuclear powers. In short, trading existing sanctions for something valuable has some theoretical appeal, but it comes with downsides.

What about using sanctions to create firebreaks in North Korea's nuclear development? Are there sanctions that can be threatened that would be sufficient to enforce constraint? It seems unlikely that threatening new sanctions will be able to contribute much to achieving this objective. After all, they have failed in deterring North Korean nuclear and missile testing and its resumption of plutonium production. One area where sanctions may play a role is in the creation of a cap on the development of a reliable ICBM warhead and possibly of militarily useful ICBMs. Such an outcome would be one objective for negotiations. But, certain sanctions options could assist in establishing the beginnings of a deterrent strategy to halt it, particularly if diplomacy were not in the cards.

5. *Establishing nuclear rules of the road.* It could be argued that the single most important lesson the superpowers learned during the Cold War was that, in the absence of clear and direct communication, they were unable to predict how the other side would perceive the actions they took in the realm of nuclear weapons. Steps that one side believed were stabilizing or that redressed a gap in deterrence were seen instead by the other side as efforts to create dangerous unilateral advantages. One side's defensive moves were perceived as offensive by the other. The two sides developed the habit of communication through arms control talks and other confidence-building channels over decades that reduced—albeit never eliminating—the tendency to misperceive and overreact. A sad alternative dynamic to that of the US and USSR is seen in South Asia where the two sides seem unable to establish mechanisms to reduce nuclear suspicions and worst-case thinking. The peninsula may be entering a period of high risk of misperception. It seems unlikely that sanctions can play any immediate role in developing a habit of communications on this topic among North Korea, its neighbors and the United States. But at minimum, a future sanctions policy should not sabotage an effort to establish this process through sanctions decisions that damage new efforts at dialogue.¹⁰

Applying Sanctions to the New Strategic Objectives

Sanctions are not an easy tool to use against North Korea. Whether their impact is viewed from an economic or political perspective, the verdict seems to be negative.¹¹ In the academic literature, the North Korean regime is considered to be the type most resistant to the successful application of sanctions. The regime is able to impose tremendous hardship on its population

¹⁰ Unlike the situation in the case of Iran, sanctions and diplomacy are not wired together well in the case of North Korea in the Obama administration. North Korea diplomacy is closely held, and the agencies and bureaucratic entities that implement sanctions are held at arm's length. While senior levels can prevent policy fratricide if they are well informed and paying attention, the reality of government is that those two conditions are not common in any administration.

¹¹ Brendan Taylor, *Sanctions as Grand Strategy* (London: International Institute for Strategic Studies, 2010), 52–59.

and its ruling elite are inward-looking, authoritarian in the extreme and closed.¹² Sanctions that cause harm to the general population have little impact on the regime. This should make targeted sanctions more attractive and effective. However, economic sanctions targeted primarily on the regime simply cannot be enforced broadly and effectively enough to have a policy impact given the differences of interests among powers essential to effective sanctions and because of the dearth of reliable data. Moreover, the regime's own policies do far more harm to the country's economy, sustainability, and legitimacy than anything conceived by outside sanctioners.

Of course, simply tossing the current sanctions into the waste bin would be much worse for the effort to halt North Korea's nuclear and missile efforts. As mentioned, the existing sanctions do have some positive impact, and their implementation should be tightened as much as possible. The point here is that, unless there is a major breakthrough with Beijing or a willingness to court global economic warfare to coerce China, sanctions alone do not offer a fundamental solution to the North Korea nuclear problem. As currently employed, they too often allow the United States and its allies to present the illusion of toughness without the reality of policy effectiveness. But used in conjunction with other tools, sanctions may be able to contribute toward achieving the objectives described above.

Deterrent Sanctions

The question, of course, is what sanctions can have a positive impact on which objectives. Sanctions appear to be most relevant primarily as deterrents to future North Korean actions or decisions. They would be used in response to significantly important actions directly threatening US vital interests or those of the international community at large. It may well be that the threat of sanctions of very severe impact could serve as non-military signaling devices to help constrain certain North Korean nuclear actions and might also be useful in getting the Chinese more positively involved in such an effort. For deterrent sanctions to be effective, they need to be large, painful to the decision maker, and seen as very likely to happen if the decision maker takes the step that the sanctioner wishes to prevent. To be clear here, sanctions large enough to deter North Korea are also likely to be of the type that might tip it into a desperate war. They can be used only for issues so serious that the US government or its allies would contemplate war. In the author's view, these issues would be limited to the actual use of nuclear weapons or transfer of the weapons to terrorists.

An equally important question is whether China can be persuaded or compelled to support deterrent sanctions. The key variable in the effectiveness of sanctions against North Korea is the nature of Chinese participation in the sanctions.¹³ The Obama administration has persistently lobbied the Chinese government on the issue of sanctioning North Korea. Progress has been slow but measurable. The primary objective of the dialogue has been to increase Chinese sanctions pressure on Pyongyang under the current sanctions approach. The idea is to plant the seed in Beijing that the United States would want to use sanctions to prevent more radical North Korean nuclear actions. Introducing this much more difficult level of sanctions into the equation should

¹² Alireza Nader, "Engaging North Korea: The Efficacy of Sanctions and Inducements," in *Sanctions, Statecraft and Nuclear Proliferation*, ed. Etel Solingen (Cambridge: Cambridge University Press, 2015), 236.

¹³ Jinhwan Oh and Jiyong Ryu, "The Effectiveness of Economic Sanctions on North Korea: China's Vital Role," *Korean Journal of Defense Analysis* 23, no. 1 (March 2011): 117–31.

begin immediately if it has not begun already. Ideally, there would be either a formal or tacit US-PRC agreement that in certain extreme cases the PRC would support a very strong economic sanctions effort that would halt Chinese energy assistance, non-humanitarian trade and financial and investment support for Pyongyang.

In the case of North Korea, two types of sanctions might be painful enough to give the regime pause. The first would be an international embargo of the type used against South Africa, Libya and Iraq. These types of sanctions contributed to regime change in the case of South Africa, denuclearization and an end to state-sponsored terrorism in the case of Libya, and deep economic destruction in Iraq (although without achieving all the stated and unstated policy objectives for the sanctions). In the case of North Korea, this would involve a UN Security Council resolution that would, at minimum, prohibit the export of fuel and all capital goods into the country and the import of goods from North Korea, as well as banning foreign investment in the country. There would be exceptions for humanitarian goods. Of course, this could not pass the UN Security Council or be enforced without Chinese support. But could it be acceptable to the Chinese if such a resolution were to be introduced only in response to a North Korean transfer of weapons to terrorists or Pyongyang's own use of nuclear weapons? Could Beijing be persuaded to agree to the terms in advance and to let Pyongyang know about its agreement? For more than 12 years now, Beijing has slowly moved toward acceptance of increasingly stringent sanctions against North Korea.¹⁴ This sanction would be an order of magnitude more severe, but the prospect of nuclear war on China's border might make the idea of a non-military deterrent of this scale more attractive.

A similar sanction could be effected without PRC acquiescence through unilateral US action. The United States could pass legislation that would cut off any entity—including foreign governments or their central banks—from the US financial system if they supplied fuel, energy or investment to North Korea if Pyongyang used a nuclear weapon or took some other step of equal impact on vital US security interests. Admittedly, this is the sanctions equivalent of the Soviet doomsday machine in “Dr. Strangelove.” In the 1964 movie, the doomsday machine kills everybody, including the country that builds it. Banning China from the US financial system, if it refused to halt trade with North Korea, would have cataclysmic effects on both the global financial system and the US economy. But if the sanction was triggered only by a North Korean act that the United States believed could lead to nuclear war on the Korean peninsula, it might well be used to signal to China and the DPRK that some steps are so serious, so devastating that the United States was prepared to contemplate the most severe steps in response.

The ICBM Issue

This paper mentioned one technical development of direct interest to Washington: the work North Korea has yet to do on developing and fielding an effective inter-continental ballistic missile (ICBM) that can target the United States. This step is the most important unfinished piece in North Korea's nuclear deterrence strategy.¹⁵ Without being able to target the US homeland, Pyongyang cannot be sure that it can deter US military action against it. At the same time, with even a very limited North Korean ability to strike US cities with an ICBM, US options

¹⁴ Taylor, 45–46.

¹⁵ Smith, 19.

on the Korean peninsula are likely to become extremely constrained, its alliances could be stressed, and the domestic pressures on the US government to do something about the North Korean threat to the American homeland will grow. Whether North Korea would be open to diplomatic discussions aimed at ending this threat is unclear, but seeking a firebreak also through sanctions makes sense. If the United States considers the development of a militarily credible ICBM—particularly an effective reentry vehicle for a nuclear warhead for such a missile—to be fundamental to its security interests, it should seriously consider putting down a difficult and risky unilateral sanctions marker to make that clear.

For example, the US could consider passing legislation somewhat similar to the Iran and Libya Sanctions Act that so bedeviled US-European relations in the 1990s. This legislation would not mandate sanctions of the same severity as those described above. But the sanctions would target important sources of income and economic growth for North Korea. In particular, they would target investment in the mining and export industries—the two areas of growth in a still moribund North Korean economy. In effect, it would deny the regime the second half of its dual strategy of nuclear weapons and national prosperity.

If North Korea, for example, tested an ICBM reentry vehicle, firms or entities that invested more than a minimal amount in the mining and export sectors would be subject to US sanctions. This would affect Chinese entities almost exclusively, but if enforced, it would hurt the North Korean economy. Of course, that would come at the expense of US-Chinese relations. While this sanction has some theoretical appeal since it targets a particularly worrisome component of North Korea's future nuclear development, it is hard to generate much enthusiasm for it. It is unlikely to be enough to dissuade the North Koreans, and it comes with a high cost in Beijing.

US responses to North Korean ICBM developments in the sphere of missile defense as well as other upgraded strategic responses are likely to be more effective—albeit with a significant risk premium of their own. Of course, establishing negotiated or unilateral constraints on North Korean missile progress would be the approach with the least cost and highest probability of success. It is possible to conceive of the proposed sanctions as some form of bargaining chip in such a process.

Conclusion: A Much Smaller Role in a Much Bigger Problem

The evolution of North Korea's nuclear and missile programs has created a new strategic reality. In that reality, the current sanctions approach cannot lead to the denuclearization of North Korea and may not do much more to slow it. It is time to take a step back and reconsider how sanctions might be used productively to achieve strategic ends rather than be treated as a policy in themselves. While there are reasons not to give up formally on North Korea's denuclearization, a new strategy might better be aimed at limiting the dangers that would emerge from an unconstrained North Korean nuclear deterrent strategy. In such a strategy, the threat of severe sanctions might help serve as deterrents on the worst potential North Korean actions, while negotiations over relief from specific existing sanctions could contribute to a revived negotiation process aimed at limiting North Korea's nuclear programs. This new approach to sanctions should be considered whether or not China is on board with it, but it would certainly be less risky and more likely to succeed if Beijing were to agree.

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Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org

Trapped in No-Man's-Land: The Future of US Policy Toward North Korea

JOEL S. WIT

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Joel S. Wit, concurrently a Senior Fellow at the US-Korea Institute (USKI) at the Johns Hopkins School of Advanced International Studies (SAIS) and an adjunct Senior Fellow at Columbia University's Weatherhead Institute for East Asia, is the co-founder of "38 North" (www.38north.org) and the project lead. An internationally recognized expert on Northeast Asian security issues and non-proliferation, Mr. Wit has 20 years of experience in the US State Department and the Washington think-tank arena. In 1993, he joined the staff of Ambassador Robert L. Gallucci and was an important player in reaching the 1994 US-North Korea Agreed Framework. From 1995-2000, Mr. Wit was the State Department Coordinator for implementation of that agreement, playing a key role in the formation of KEDO and its operations as well as working with North Korea on other aspects of the Agreed Framework. He has written numerous articles on North Korea and non-proliferation including, "US Strategy Towards North Korea: Rebuilding Dialogue and Engagement," published by Columbia University and the US-Korea Institute at SAIS. Mr. Wit is also the co-author of the book, *Going Critical: The First North Korean Nuclear Crisis*.

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TRAPPED IN NO-MAN'S-LAND: THE FUTURE OF US POLICY TOWARD NORTH KOREA

Background

US policy toward North Korea has reached a dead end. Built upon a foundation of dubious assumptions, the Obama administration's approach—whether called “strategic patience” or by some other name—has failed to achieve any progress toward US objectives in the region and no longer serves US foreign policy and national security interests. During the administration's time in office, the North's nuclear and missile threat has expanded, the danger of periodic tensions and unintended escalation on the peninsula has grown and little or nothing has been accomplished in terms of effectively dealing with non-security challenges such as Pyongyang's human rights violations. Moreover, the North has managed to improve its economy while at the same time moving forward with its nuclear and missile programs. In fact, by adopting a policy that in effect stands back from the fray, the United States has diminished its status as the arbiter of peace and security issues on the peninsula.

While most experts in Washington agree that the current US policy has failed, there is little or no agreement on alternative approaches. Moreover, there appears to be scant chance that the Obama administration will alter course with less than a year left in office. Admittedly, dealing with Pyongyang is difficult under the best of circumstances, and the past seven years have proved particularly challenging. Developments since the leadership transition in Pyongyang and uncertainties about the North's future, continuing nuclear and missile efforts (nuclear tests in 2009, 2013 and 2016 and space launches in 2009, 2012 and 2016) and the failure of the 2012 “leap day” deal all complicated matters. It is also true, if former campaign and other officials are to be believed, that, once briefed on the realities of the North Korean nuclear program, the incoming administration made a conscious decision even before these events that attempting to reach a diplomatic solution with the North would be politically unwise given the risks of failure. Add to this witches' brew the donnybrook in Washington over the Iran nuclear deal, and any renewed effort to formulate a new initiative toward the North seems more than unlikely.

As a result, the Obama administration has settled into an approach characterized by limited sanctions that have not forced the North to choose between economic development or the development of nuclear weapons and missiles. Nor have its sanctions significantly affected the development of weapons of mass destruction (WMD). Limited sanctions are accompanied by limited diplomacy; insisting that Pyongyang meet preconditions before the Six Party Talks can resume has also produced no results. Meanwhile, these two tracks are supplemented by

justifiable security measures intended to selectively bolster defenses on the Korean peninsula and the continental United States against potential North Korea threats. Finally, little has been accomplished in building a coalition of key states in opposition to Pyongyang's efforts. Despite periodic pronouncements by the administration and others that China's views are moving closer to those of Washington, Beijing's policy toward the North has little in common aside from public statements that the peninsula should be nuclear-free. In short, the Obama administration is trapped in a policy no-man's-land, stuck with a halfhearted approach that has proved ineffective.

This reality is reflected in the administration's public statements on its North Korea policy that emphasize the shared goal with other key players of a nuclear-free Korean peninsula, that the United States will never accept a nuclear North Korea, that the North will not be able to build a nuclear arsenal and develop its economy at the same time and that Pyongyang needs to choose between a prosperous future integrated with the international community and isolation and collapse. These statements bear little resemblance to reality. Even Secretary of State John Kerry seemed to recognize this disconnect when he candidly admitted in September of 2015 that a key component of the administration's policy, sanctions against Pyongyang, seemed to be having little effect.¹

While it may be true that the United States and others will never accept North Korea as a nuclear state, the international community's approach is trending toward tacit acceptance. That is certainly the case for other key countries in the Six Party process as well as many in the international community. For example, Russia recently proclaimed that it will not accept North Korea as a nuclear state.² That may be true as a political statement. But in reality, Russian policy, which seeks to build economic ties with Pyongyang, has the opposite effect. The same argument can be made for China with its deep economic and other ties with the North. And a number of other countries in the international community also have economic interaction with Pyongyang. Still others—India, for example—may in the future build such relations. The overall trend plays into Pyongyang's ultimate fantasy: to be a second Pakistan, accepted as a nuclear weapons state while having normal relations with the international community.

North Korea is, of course, exploiting this situation in hopes of achieving its maximal policy objective by avoiding the resumption of the Six Party Talks, building up its nuclear arsenal and seeking to establish better ties with countries other than the United States. Indeed, an argument can be made that Pyongyang is well on the way to achieving that objective and that it will make even further significant progress over the next five years down that road if its nuclear program expands as predicted. And all of this is enabled by a US policy that has not seriously sought to push the North to make difficult choices, allowing Pyongyang plenty of running room. Under these circumstances, it is hard to imagine the North adopting any approach other than the one it is now pursuing.

¹ "Press Availability With South African Foreign Minister Maite Nkoana-Mashabane," US Department of State, September 15, 2015, accessed May 31, 2016, <http://www.state.gov/secretary/remarks/2015/09/246978.htm>.

² "Russia won't recognize N. Korea as nuclear power: Russian deputy FM," Yonhap News Agency, October 4, 2015, accessed May 31, 2016, <http://english.yonhapnews.co.kr/news/2015/10/04/0200000000AEN20151004001100315.html?679e50e8>.

Whether the upcoming presidential election in the United States and a new administration will result in a different approach toward North Korea remains unclear. Certainly, there is likely to be, at the very least, a review of the Obama administration's policy and a consideration of the wide range of options. Such a review will have to take into account a number of important realities. First, contrary to widespread wishful thinking in the United States and South Korea, Kim Jong Un's regime is unlikely to collapse and reunification is unlikely to take place during the few months remaining in Obama's final term in office. Second, the nuclear and missile threat from North Korea may be poised to grow significantly under a new US administration, particularly if the North's efforts to produce highly enriched uranium are gathering momentum. Third, the other challenges cited above—ranging from instability to human rights violations—are unlikely to diminish. Finally, devising a policy to effectively deal with these problems will be difficult, if only because the chances of success are low and the danger of domestic political criticism are high.

So What?

What are the threats and challenges posed by North Korea? That is a logical first question in order to start building a policy. While the answers are very clear, one characteristic of being stuck in a policy no-man's-land is a growing weariness when it comes to addressing the dangers presented by a nuclear-armed North Korea. The North's threats are discounted, ignored or papered over, because of Pyongyang's overblown rhetoric and the fact that nothing ever comes of it or the logic that the North is smart enough to know that it would only be committing suicide if it challenges the United States militarily. There is also an underlying hope that these threats receive little public attention given the failure of the current policy approach. The North's human rights violations, which do receive a great deal of attention because of the work of the UN Commission of Inquiry's findings and the endless stream of North Korean defectors telling their stories, are the one exception to the rule. But the focus on this problem distorts the reality that North Korea is a serious security threat to the United States and its allies. Overall, this situation serves North Korea's purposes; weariness can lead to tacit acceptance.

Still, the challenges are clear and straightforward.

First, an incident on the peninsula or North Korean provocation could trigger a significant military or naval engagement that would lead to a larger conflict and a tragic loss of lives on both sides. With an increasing North Korean nuclear stockpile, there is also a threat that those weapons could be used in such a conflict. South Korean retaliation in response to DPRK provocation could also draw in the United States and China on opposite sides, putting a major strain on US-PRC relations. It has not happened yet, but the dangers of escalation after the North's 2010 artillery attack on the South's Yeonpyeong Island seem to have been a real cause for concern. If and when it does happen, the crisis will be real and the consequences enormous.

Second, the North could transfer sensitive nuclear weapons technology to a terrorist group or to a state sponsor of terrorism. Pyongyang transferred a plutonium-production reactor to Syria in the mid-2000s only to have the facility destroyed by an Israeli air strike. A DPRK with a small stockpile of plutonium and a handful of crude nuclear devices and unsophisticated ballistic missiles may not pose a big proliferation challenge. As its nuclear weapons stockpile and arsenal

of sophisticated ballistic missiles grow, however, the DPRK could become more of a WMD export threat, believing that the United States and the international community would be deterred from punishing a country awash with nuclear weapons.

Third, short of war, there is a threat that the North's growing nuclear weapons and ballistic missile programs could spur Japan and South Korea to reconsider their commitment to non-nuclear status, which would unravel the Nuclear Non-proliferation Treaty and reduce the security of countries in the region and around the world. The downsides to going nuclear would be significant for both countries, but that option has increasingly become part of respectable policy discourse in both countries.

Fourth, a DPRK bristling with nuclear weapons could put greater pressure on the ROK and Japan to develop conventional capabilities for preemptive strikes. Indeed, there is growing talk in both Tokyo and Seoul of developing these capabilities. Improvements in South Korean, Japanese and US military capabilities in the region, especially improved missile defenses and conventional preemption capabilities, would trigger a negative Chinese reaction. The combination of an arms race and conventional and nuclear forces on higher alert rates is a recipe for instability on the peninsula and possibly a North-South conflict.

Fifth, according to some estimates, if the North Korean WMD threat is not contained over the next decade, it could acquire up to 100 operational nuclear warheads and the means to deliver these weapons throughout the region and possibly against the United States. If the North were to acquire even the semblance of an operational intercontinental delivery system, it would represent an entirely new security threat to the United States.

Sixth, given the possible growth of Pyongyang's nuclear arsenal, the United States and its allies would confront even graver dangers if North Korea becomes highly unstable in the future, given the loss of centralized control over a much larger nuclear and WMD stockpile and the possible leakage of these weapons across North Korean borders. That is the reality since there is little likelihood of seizing and securing these weapons in an unsure security environment, one that will almost certainly be characterized by a large-scale North Korean insurgency against invading forces.

Finally, as was mentioned above, while US policy has always included an agenda of encouraging gradual change inside North Korea, that agenda, particularly North Korea's human rights record, has come in for greater attention over the past decade. As a result, that issue has now moved into a more prominent place on the US policy agenda and will need to be addressed in the future.

Think Again

Despite the clear dangers and challenges, the Obama administration's policy toward North Korea has rested on a number of dubious assumptions that have proved wrong over the past seven years.

The North needs us more than we need them. The assumption has been, particularly in the wake of Kim Jong Il's stroke and death and the subsequent leadership transition, that a politically

and economically weak North Korea needed the United States. That has proved to be false. In theory, North Korea has been interested in better relations with the United States. But over time the importance of an improved relationship has diminished. Today, there may be some burning embers left but better relations with Washington are not nearly as important to the current regime as they were to its predecessors. In fact, the DPRK believes it can afford to wait to return to any negotiations (or not return at all) given its current political and economic situation. Moreover, if the North does return at some point it will be in a stronger negotiating position given the expansion of its nuclear and missile programs.

North Korea is isolated and broke. Despite the media drumbeat of poor China-DPRK political relations, the North's economic ties with China are expanding and other countries are increasing foreign aid and investment. Industrial and agricultural production is growing, and more foreign firms are operating in North Korea. In short, like any developing country, North Korea has serious economic and social problems. Its economy is by no means healthy, but it has been improving. Moreover, this is happening at the same time that the North is moving forward with its nuclear program. In effect, from a North Korean perspective, Pyongyang has proven it can have its cake and eat it too.

Time is on our side. Contrary to the past few years of wishful thinking in the United States and the renewed fixation in South Korea on reunification, all signs point to Kim Jong Un remaining firmly in control. The regime has successfully withstood limited pressure, sanctions and isolation and is arguably stronger today than it was in 2009. The view that the United States can ignore North Korea because it will collapse sooner or later is like whistling past the graveyard. Moreover, Kim's perspective may be that he has decades left in power before he departs the scene, time enough to build a DPRK that is a nuclear weapons state with an improving economy through a gradual process of building ties with segments of the international community other than the United States and its close allies.

China will carry our water. How much more evidence does Washington need that China is not going to fix the North Korean problem by putting so much pressure on Pyongyang that it might cause instability? That hope has been present in every administration dating back to Richard Nixon. For a time—from the Clinton administration through part of the Bush administration—US-Chinese cooperation in dealing with the North was fairly good. But today when the United States beseeches China to squeeze the North, Washington is urged to exercise restraint to prevent escalation and reduce tensions and to resume dialogue with the North. The only outcome PRC leaders fear more than a nuclear DPRK is a highly unstable nuclear North Korea. In short, China is not going to save America's hide but Beijing might prove more cooperative if the United States tried to take its concerns into account rather than conducting a dialogue of the deaf.

The North will renege on any agreements it signs. The lack of understanding of the history of US-DPRK relations distorts the policy discussion in Washington. Contrary to the prevailing view, the DPRK is able to reach agreements that could have dramatic effects on its nuclear weapons program. Under the 1994 Agreed Framework, the DPRK ended a multibillion-dollar plutonium program that could have produced as many as 100 nuclear warheads by 2000 because of an agreement it kept with Washington. The North has backtracked in the past from commitments it has made to the United States, and there are no guarantees that it will abide by future agreements.

However, Washington can help deter violations and mitigate their consequences by building provisions into agreements that serve US interests, enforce compliance, and provide early warning of noncompliance.

Realism Versus Magical Thinking

There appears to be a consensus among most experts on all sides of the issue that if the United States stays on its current path, the challenges posed by the North will only grow. But there is no consensus on an alternative policy. Some advocate a strategy of strong containment based on more punitive sanctions, more aggressive military measures and other efforts to pressure, isolate and even force the North to collapse; others argue for a policy of strong diplomacy focused on engaging North Korea in direct negotiations, normalizing US-DPRK relations, reducing the North Korean nuclear and missile threats and seeking gradual changes in the North's internal practices. Others argue that South Korea should take the lead in resolving the challenges posed by North Korea, including by its nuclear and missile programs. Still others look forward to reunification as the path to ending the North Korean challenge. And others point at their reading of the past 20 years of failed efforts to solve this problem and see North Korea as an unsolvable problem, a challenge that the United States will have to learn to live with.

Parsing this wide range of options is difficult for even the most experienced analyst of Korean affairs and is particularly daunting for decision makers. Leaving aside political calculations, they must wade through misperceptions, misconceptions, uncertain information and poor analysis. Overall, the task is clear, however, to separate out pragmatic policy prescriptions based on realistic objectives and the means to achieve them from “magical thinking” characterized by unrealistic goals and the absence of the tools to achieve them.

Magical Thinking: Part 1—Regime Demise and Reunification

The recurring view that the North is on the verge of collapse, and indeed, that US policy should seek to bring about its demise, accompanied by the South Korean government's current fixation on reunification, is a clear case of magical thinking. The logic train is as follows: The North Korean regime is poised on the brink of collapse. Its demise would bring about a transformation of the situation on the peninsula that would solve the security challenges posed by North Korea, stop the human rights violations committed by the current regime, free the North Korean people and open the way to reunification along the lines envisioned by ROK President Park Gyun-hye and her “reunification bonanza.” True, there might be some problems along the way; an uncertain security situation in the North in the wake of the government's collapse, problems with a China unlikely to just step aside and let the South (and the United States) determine the future course of the peninsula, and enormous economic costs. But these difficulties all appear to be manageable if the proper preparations are taken.

Moreover, a number of experts believe the United States can and should formulate a policy designed to hasten the end of the North Korean regime, whether through adopting much stronger sanctions, stepping up efforts to get information to the North Korean people about the realities of their plight or finding ways to shove China into a much more proactive policy designed to engineer regime change. Still others say now is the time to support a North Korean resistance

force that would provide an existing organization when the regime no longer exists. It would consist of “potential actors” inside the North who would assume leadership roles in the resistance and “the right Koreans and in particular those Koreans who have escaped from the north and they in turn can infiltrate to assist in the organization, training and operation of a resistance.”³

Why is this line of thought magical thinking? First, Pyongyang has proved surprisingly resilient in the 25 years since speculation about collapse began, and there is no reason to assume that current speculation is any different from past prognostications. Even under the worst possible circumstances for the Pyongyang regime—for example, a humanitarian crisis created by significant food shortages as in the 1990s—China would almost certainly step in to prop up the North Korean regime given its concerns about instability. Second, formulating a realistic policy designed to achieve the objective of regime demise is near impossible. It is certainly magical thinking to assume that stepped-up information flows into North Korea will counteract half a century of continuing indoctrination of that country’s population. It may have a gradual impact, but that will take place over generations, not overnight. And finally, the idea of establishing a North Korean resistance force ready to take over, and perhaps assist in the regime’s demise, is probably the height of magical thinking. There are a multitude of potential problems with this approach, not the least of which is finding the manpower for such a movement.

Even more disturbing, those who talk about collapse, demise, reunification and “bonanzas” in the DPRK seem to have learned nothing from the failed American policies of regime change elsewhere in the world over the past decade or more. In theory, achieving an end to the North Korean regime is a very attractive option. In practice, advocates forget (or ignore) the law of unintended consequences seen so clearly in Iraq and Libya, where regime change has produced very negative results and unleashed new and potentially more threatening forces. All the rosy predications about the outcome of regime change in both cases have proved totally wrong.

In the case of North Korea, even if the regime collapses—and that in and of itself constitutes wishful thinking—the assumption that the peninsula will then be on a glide path to reunification is a dangerous misconception. It is very easy to visualize collapse leading to an interminable insurgency in the North conducted by fanatical elements of the army, supported by seven million North Koreans who have received paramilitary training to conduct guerrilla warfare, armed with weapons that have been distributed throughout the country and motivated by 60 years of political doctrine emphasizing the myth of anti-Japanese partisan warfare and hostility toward any foreign intervention. Fighting such an insurgency would require hundreds of thousands of troops—mainly South Koreans—many of whom would be killed or wounded. In addition to fighting a large-scale insurgency, the United States and South Korea would have to secure North Korea’s large WMD arsenal. According to a recent RAND study, such a mission will require 150,000 more troops than the US Army has dedicated to achieving it.

³ David S. Maxwell, “Support to Korean Resistance: Has the Time Come?” *Small Wars Journal*, August 5, 2015, accessed May 31, 2016, <http://smallwarsjournal.com/jrnl/art/support-to-korean-resistance-has-the-time-come>.

Magical Thinking: Part 2—Change over Time Equals an End to Security Threats

At the opposite extreme, another school of thought argues that a frontal assault on North Korea's nuclear and missile programs is hopeless because they have become too advanced. The alternative is a "change agenda" policy in North Korea, focusing not on security challenges but mainly on building political, economic, social and other ties. That presumably would include a panoply of government and nongovernment programs such as economic interactions, people-to-people contacts and cultural exchanges. The theory is that building those ties between the North and the outside world will alter Pyongyang's threat perceptions, gradually undermine its determination to keep its WMD programs and create the basis for peace and stability on the peninsula. In short, an end run around the current security roadblocks will result in eventually ending those challenges.

This approach also represents magical thinking for a number of reasons. First, while it is worth noting that political, social and economic change has been under way in the North since the 1990s, any additional efforts through a more concerted effort to build ties with the international community, even if successful, will take place over generations, not overnight, and will be shaped to suit the regime's agenda. During that long time period, the security challenges posed by the North could easily grow. Second, it is naive to assume this approach will persuade the regime to transform its external policy to the point where security challenges will diminish and disappear. It is just as likely that the North will use such an approach to forward an alternative agenda—namely to secure tacit and maybe explicit acceptance by the international community of its status as a nuclear power. Third, because of that distinct possibility this approach may lead to a situation that is even more politically untenable than past efforts to engage the North, namely one where there are ongoing efforts to push a change agenda while the North continues to build more nuclear weapons and develop more ballistic missiles to deliver them. (Indeed, this is the challenge facing South Korea as it tries to improve inter-Korean ties through seeking non-security confidence-building measures.)

More Magical Thinking or Realism: Mutual Threat Reduction

Policies at the extremes may be magical thinking, but that leaves the question as to whether a resurrection of coercive diplomacy—a combination of carrots and sticks—also would constitute magical thinking. Leaving aside domestic considerations for a moment, many experts would point to the past 20 years of history of US-North Korean relations as one continuously failed effort to stop Pyongyang's nuclear and missile programs. That conclusion is incorrect, and a strong case can be made that in fact the period from 1994 until 2002 was successful in derailing a nuclear program that was expected to build as many as 100 nuclear weapons by 2000. When the 1994 Agreed Framework collapsed, the North had only enough material for less than five weapons and only today is about to embark on a significant expansion. The North's shift was the result of a basic political decision that building better ties with the United States was the most important foreign policy priority for Pyongyang.

Certainly, there are significant differences between the situation in the 1990s and today. First, there is the common failed experience of the Agreed Framework and subsequent efforts to improve relations. While the United States has its own historical narrative about that failed

experience, so do the North Koreans, who see the failure as a result of a Washington that reneged on its promises and was more interested in engineering regime change than better relations. Second, based on that experience, interest in achieving better relations is now at a low point, not just in Washington but also in Pyongyang. Third, North Korea sees its efforts at developing and producing nuclear weapons and ballistic missiles as finally paying off, particularly in the nuclear area where its stockpile is probably expanding. Fourth, overall, contrary to the public perception, the North Koreans probably see themselves in a stronger position today to deal with external threats and to promote domestic economic modernization under their new leader than almost anytime in the past. In short, the predominant stream of policy thinking not just in Washington but also in North Korea is not one that would support a resurrection of the “golden years” of the 1990s.

Still, at least as late as 2013 into 2014, there appears to have existed in the North an alternative, albeit a minority, view that is willing to explore a resurrection of efforts to improve relations with the United States. That view, naturally held by the North Korean Foreign Ministry, whose authority had also diminished significantly since the 1990s, still focused on finding a diplomatic path forward that could lead to reducing the threat posed by each side to the other. The approach would basically consist of a phased effort at mutual threat reduction with the United States and North Korea at the center of the process that would entail political, nuclear, missile, economic and other measures taken by both sides. The end point would be a peace treaty finally officially ending the Korean War, normalization of relations between the various countries—including the United States and North Korea—and denuclearization of the Korean peninsula. Of course, such an effort would be enormously complicated and difficult to negotiate. That means not only the substance involving a wide range of difficult legal, political and technical issues but also the process itself. A Six Party forum would be entirely inadequate for the task.

Nevertheless, the North Korean view may at least hold the possibility of finding a way forward if it were to be shaped according to US interests. For example, one approach would be for the United States to propose beginning immediate talks to reach a peace treaty ending the Korean War. This, of course, would represent a shift from the current American position emphasizing progress toward denuclearization before peace talks could begin. But as part of this proposal and signifying a willingness to address a fundamental North Korean concern about Washington’s “hostile policy,” the United States would demand a willingness of Pyongyang to address North Korea’s “hostile policy” toward the United States and its allies, largely represented by the North’s nuclear and missile programs. While this demand would seem to require a shift in Pyongyang’s policy that appears to emphasize reaching a peace treaty first and then denuclearization, at least privately the North Koreans seem open to such a possibility. In effect, the new approach, if accepted by the North Koreans, would set up a simultaneous negotiated phase-by-phase movement toward a peace treaty accompanied by denuclearization.

Such a process would, of course, be enormously complicated and might never reach the end point. Moreover, it could involve significant risks. The most obvious danger lies in defining the end of the nuclear threat on the Korean peninsula. That could well mean, from the North Korean perspective, that the US-ROK alliance must also end and that US troops would have to be withdrawn from the peninsula. Of course, such an outcome would be unacceptable to the

United States as part of any negotiated arrangement with Pyongyang. Indeed, how this issue plays out from the beginning of talks would be a litmus test for whether or not North Korea is serious about negotiations. At least privately, once again, the North Koreans have expressed a willingness to finesse this issue, arguing that at the end of this process, US troops can remain on the peninsula to help reassure both South Korea and Pyongyang.

Escaping No-Man's-Land

While national interest may dictate that the United States escape the policy no-man's-land, the political and other constraints on Washington are real. That reality raises an important question: What developments might facilitate a shift in policy out of the current morass? The election of a new US administration that recognizes the dangers and is willing to take the risk in order to formulate a more proactive policy would certainly solve this problem. But right now that seems unlikely given the field of Democratic and Republican candidates.

Looking ahead, there are other possible developments, either individually or in combination, that may help persuade a new administration to adopt a new approach.

Implementation of Iran Deal: Speculation focusing on whether North Korea is next on the diplomatic docket has been misplaced at least for the rest of this administration. But the success or failure of the Iran deal in the next few years could have an impact on Washington's future willingness to test the diplomatic proposition with North Korea. Success—constraints on Iran's nuclear program are in place, implementation is going well and overall relations between Washington and Tehran are thawing—could weaken the political position of opponents to a more vigorous diplomatic effort with North Korea and embolden a new administration that recognizes the serious downsides of letting the problem fester. Conversely, failure of the Iran deal—for example, through poor implementation or discovery of significant cheating—would make it even more unlikely that an administration might undertake a new initiative toward Pyongyang.

South Korean Election: The election of President Park in 2012 caused speculation that she might nudge the Obama administration away from its current approach to a more proactive policy that included a sustained diplomatic effort. That has not been the case. Her approach to the North has been characterized by what appears to be indecision and inconsistency as well as a desire not to create waves in Washington while attempting to prompt China to become more supportive. With the next South Korean election over the horizon in 2017, one possible outcome would be the election of an opposition candidate closely associated with former President Roh Moo-hyun or others who are firmly in favor of greater engagement with Pyongyang. A new ROK approach along those lines could create pressures for Washington to reconsider a policy based largely on containment. That shift may even be the case if a ruling party candidate is elected given frustration underneath the surface in Seoul with Washington's hands-off approach.

Tensions on the Korean Peninsula: The Obama administration's tenure in office has been characterized by significant periodic tensions, but they appear to have had little impact on its overall policy. However, a new administration may not be as sanguine about the prospects for these tensions to escalate out of control on the peninsula. And if it were to experience an incident that seriously threatened to escalate, that event might contribute to a reformulation of US policy

to be more proactive in dealing with the dangers posed by Pyongyang, whether entailing strong sanctions, more energetic diplomacy or military countermeasures.

Public Manifestations of the DPRK WMD Threat: Much of the development of North Korea's WMD programs has happened out of public view, with the obvious exception of its four nuclear and space-launch vehicle tests, the last ones just a few months ago. Part of the reason is probably just the nature of the process of developing these weapons, part a calibrated effort by the North to slowly reveal its capabilities and part the North's secretive nature. As these programs move forward, there is the distinct possibility that their progress will become more obvious to the international community, triggering greater concerns about the potential threat. That may mean more nuclear tests, tests of new long-range missiles and other steps by Pyongyang. Any of these developments, by highlighting the growing danger and the failure of US policy, may jar a new administration into a different policy.

US-PRC-DPRK Relations: Chinese policy could shift away from its continuing support of the DPRK and toward a position more in line with the United States and South Korea. Such a shift would reflect recognition that Pyongyang is becoming a burden and even a threat to Chinese security and could be triggered by the North pressing ahead with more nuclear and long-range missile tests or further conventional provocations. Pyongyang's actions could result in serious instability on the peninsula, US and allied military countermeasures (such as a stepped-up ballistic missile defense effort) or strong sanctions against the North that adversely affect Chinese banks and businesses. While the policy shift may have limits (it is unlikely Beijing would actively seek an end to the North Korean regime), China could become willing to apply greater political and economic pressure.

2016 US Presidential/Congressional Elections: The Iran debate clearly demonstrates a strong domestic political constituency that opposes diplomacy with "rogue states." Moreover, the history of US-North Korean relations depicting a long effort by Washington to stop the North's nuclear weapons program and to improve relations that has failed because of Pyongyang's duplicity—accurate or not—is a factor that feeds this opposition. Whether the upcoming election will diminish or enhance the strength of that constituency—for reasons that have nothing to do with North Korea—remain unclear at this point. The election of a Democratic president along with substantial Democratic gains in Congress will not result in support for a new North Korea policy. But it would help diminish active opposition to an administration interested in shifting toward a more proactive stance.

Developments in DPRK Policy: While Pyongyang's views on denuclearization have not been as hard and fast as most experts believe, the trend has clearly been in the wrong direction over the past eight years for a number of reasons ranging from the leadership transition to the growth of the North's nuclear arsenal. There still appears to be some interest in engagement on the part of the North with the United States, South Korea and Japan, although the impetus behind that interest is weak. Putting aside the erroneous view that the North Korean regime's domestic legitimacy is now intertwined with its nuclear status that if true would make diplomacy hopeless, how that might change is a matter for speculation. A change in Pyongyang's external environment might result in a shift in the North's policy, the obvious example being a much tougher Chinese policy that would result in the North's seeking to counterbalance Beijing. A

stronger international effort—perhaps joined by China—to put pressure on the North might force tough choices in Pyongyang between the nuclear program and economic developments. Conversely, a shift in American policy signifying a willingness to address the North's security concerns in return for nuclear and missile constraints might have a similar effect.

That failure is reflected in three things: 1) North Korea's continued progress in developing nuclear weapons and missiles to deliver them, progress that could have a big payoff in the next five years if expectations that its nuclear stockpile is poised to rapidly expand; 2) continued periodic tensions on the Korean peninsula that threaten to escalate into large-scale conflict, particularly in the event of miscalculation; and 3) the danger that a North Korea armed with a growing stockpile will not only pose a regional security threat but also undermine the international nonproliferation regime if it seeks to export WMD technology growing international concerns

In the wake of the DPRK's recent missile and nuclear tests and Pyongyang's pronouncement that it is no longer committed to denuclearization, the US administration has set the auto-pilot button on a course to further isolate and pressure North Korea, which will only lead to more DPRK provocations, a greater risk of conflict and instability on the Korean peninsula, the continued growth of the North's nuclear and missile arsenal, and even new overseas sales and cooperation, particularly with Iran.

The recent DPRK missile and nuclear tests, coupled with statements from Pyongyang that it has abandoned denuclearization, offer further evidence that US policy toward North Korea no longer serves US foreign policy and national security objectives in North Korea or Northeast Asia more broadly.

To address these threats, the US government needs to ratchet up pressure on the DPRK. At the same time, it should make clear to the North and China that Washington is prepared to engage in comprehensive negotiations with the DPRK on a peace treaty to replace the armistice, linked to limiting, reducing and eventually eliminating the threat from North Korea's weapons of mass destruction and normalizing US-DPRK relations. If the DPRK rejects this offer or returns to the negotiating table but is recalcitrant or negotiates in bad faith, the United States should seek ROK and Japanese support for, and Chinese acquiescence in, additional steps to isolate, pressure and contain North Korea through more aggressive military measures.

US·KOREA INSTITUTE AT SAIS

US-Korea Institute at SAIS
Johns Hopkins University
1717 Massachusetts Avenue NW, 6th Fl
Washington, DC 20036
www.uskoreainstitute.org